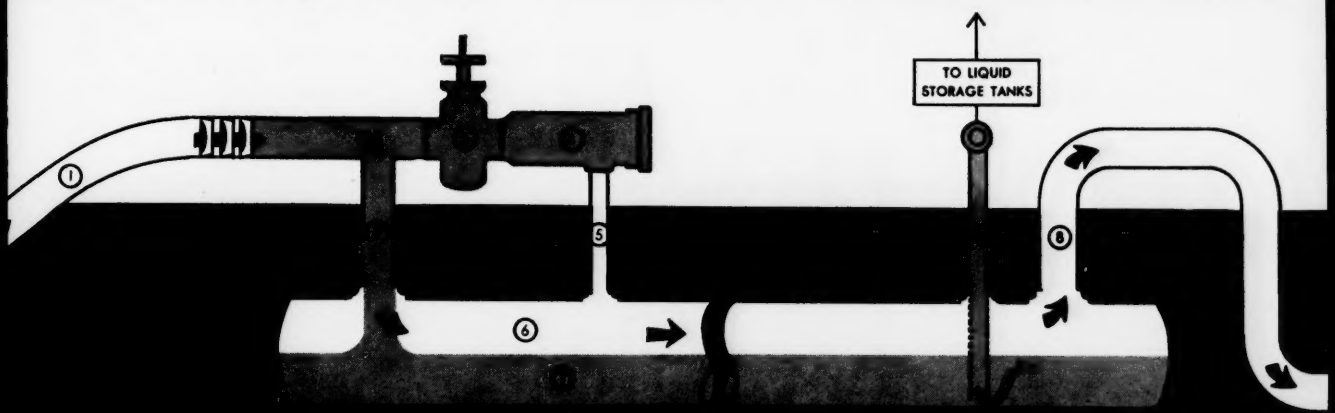
This Is A 'Pig-Catcher' – Ice, That Is

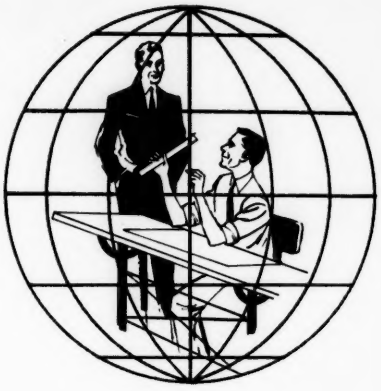
Here's How It Works



Engineering the temperature...

WITH RECOLD'S NEW, POSITIVE OIL TRAP

Recold's Dri-Fan Evaporative Condenser with Oil Trap (patent pending) increases the efficiency of the entire ammonia system by eliminating oil from the low side.

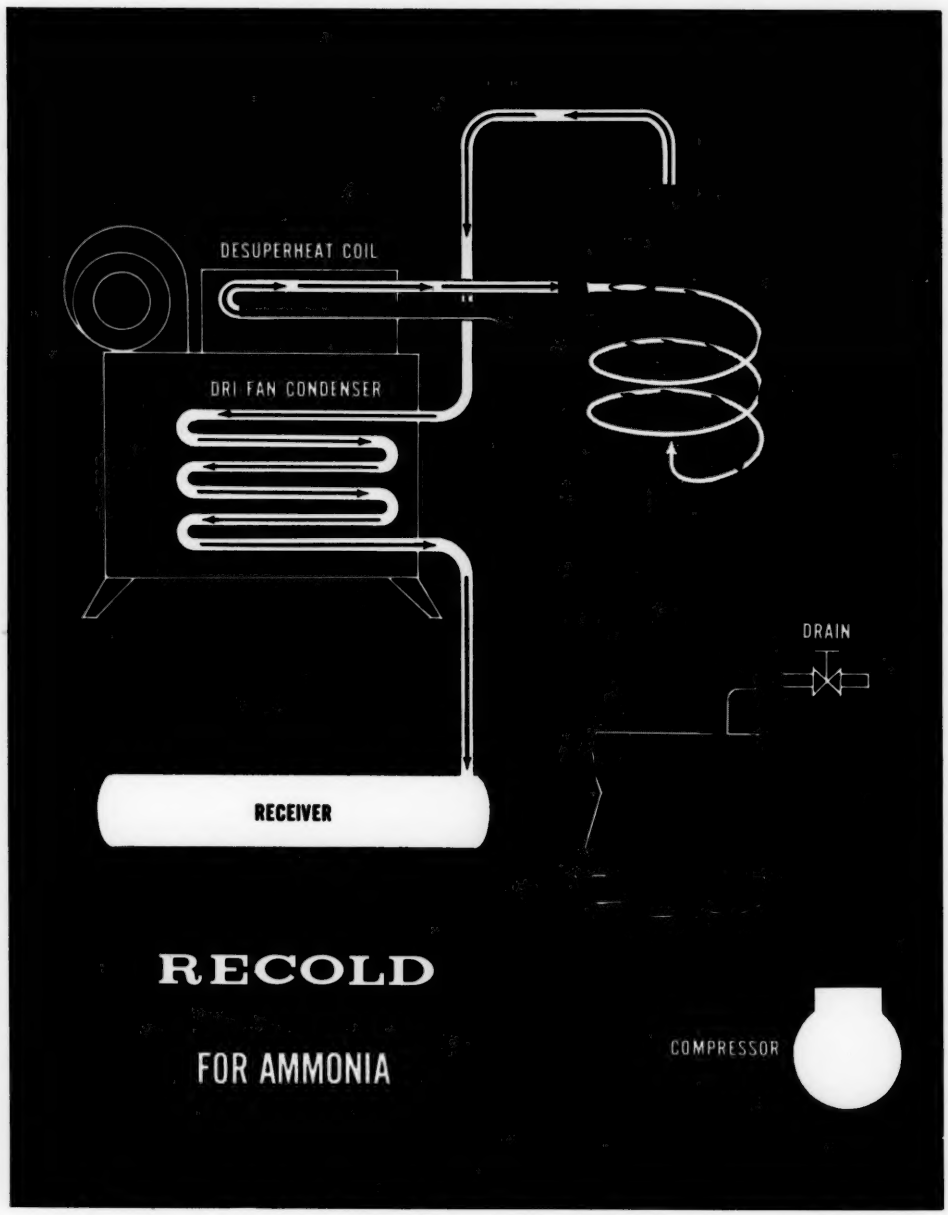


Write for details today:

RECOLD

7250 East Slauson Avenue, Los Angeles 22, California

RECOLD



STOP

"Butcher Boy"

Since 1885

No. 51 AUTOMATIC ELECTRIC DOOR DEFROSTER

(WITH THERMOSTAT)

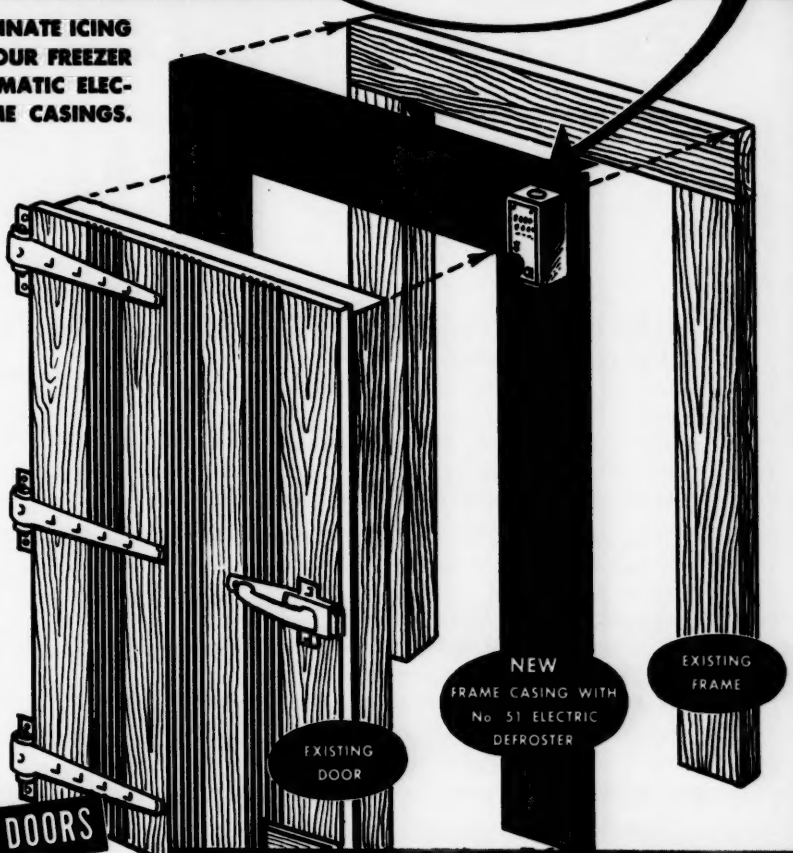
ELIMINATE ICING GASKET CONDITIONS ON YOUR FREEZER DOORS WITH BUTCHER BOY No. 51 AUTOMATIC ELECTRIC DEFROSTERS INSTALLED IN NEW FRAME CASINGS.

Easy to Install

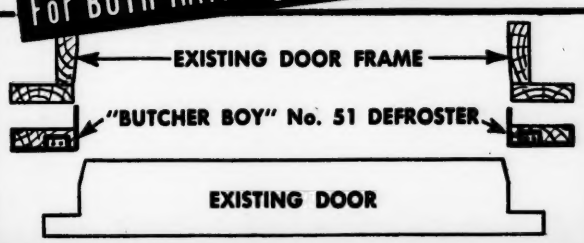
ON YOUR PRESENT DOORS

1. Remove the door and hardware from your present frame.
2. Install factory furnished frame casing with defrosters, to existing frame casing and secure in place with provided fastening devices.
3. Reinstall the door and hardware to new frame casing.
4. Connect to 110 Volt AC line and "Frost Free" door is ready for normal operation.
   Each complete unit is equipped with a "calibrated thermostat control", (adjustable range 60° to 250°F), for economical heat control. Thermostat has "pilot light" as constant guide for "on current" operation — Safety and Security Insurance.

UL Electrical materials incorporated into Butcher Boy No. 51 Defroster Units are Underwriters Appoved.



For BOTH Infitting and Overlap DOORS



Butcher Boy Refrigerator Door Co.
1000 Butcher Boy Drive, Harvard, Illinois

Please send details and prices for factory furnished frame casings with No. 51 automatic electric defrosters.

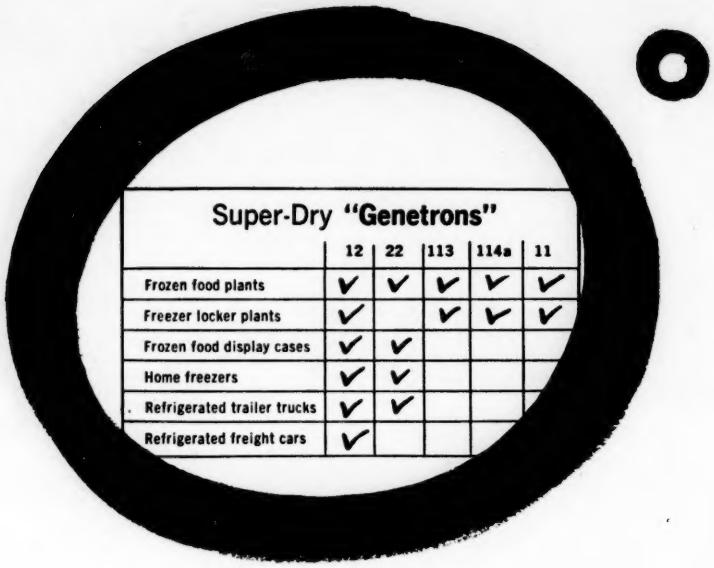
For Super Freezer Overlap Doors ☐ _____wide x _____high

For Infitting Freezer Doors ☐ _____wide x _____high

Name _____

Address _____

City _____ State _____



Zero in on Frozen Foods with genetron®

SUPER-DRY REFRIGERANTS

Ask any producer of frozen foods and he'll tell you. Actual zero temperature is *always* needed to maintain high quality and to protect product freshness. That's why, whether you package, store, ship or merchandise frozen foods, you need the sure protection of modern refrigeration equipment...and dependable "Genetron" fluorinated hydrocarbon refrigerants.

"Genetron" super-dry refrigerants are universally accepted for use as original or replacement charge in modern frozen food refrigeration systems. Leading equipment manufacturers approve them. Refrigeration engineers specify them. Wholesalers recommend them. Servicemen and contractors know they can depend on them. That's because "Genetrons" offer unexcelled purity and dryness . . . and their strict quality specifications are consistently *bettered* in production.

"Genetrons" are available from refrigeration and air-conditioning wholesalers from coast to coast. See your wholesaler. Insist on "Genetron"!

Quick Facts on "Genetron" Super-Dry Refrigerants

- Guaranteed exceptionally low moisture content
- Noncorrosive to standard equipment materials, nontoxic, nonflammable, stable, safe
- Critical and freezing points well outside range of operating uses
- Solvent action on oil helps prevent solidification or congealing of lubricant; aids in lubrication of equipment; generally miscible with oil
- Freely interchangeable and may be mixed in any proportions with comparable fluorinated hydrocarbons meeting the same strict refrigerant specifications

genetron 11 ORANGE LABEL CCl_3F TRICHLOROMONOFLUOROMETHANE
genetron 12 WHITE LABEL CCl_2F_2 DICHLORODIFLUOROMETHANE
genetron 22 GREEN LABEL $CHClF_2$ MONOCHLORODIFLUOROMETHANE
genetron 113 PURPLE LABEL $C_2Cl_3F_3$ TRICHLOROTRIFLUOROETHANE
genetron 114a BLUE LABEL $C_2Cl_2F_4$ DICHLOROTETRAFLUOROETHANE

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Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

October, 1959

Number 4

Vol. 137

Industrial Refrigeration

Now in its 68th Year of Publication

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COVER PHOTO: Pig Catcher installation on NGPL's lateral J, Jack & Wise Counties, Texas, gathering system. Slug catcher is buried between pig catcher (foreground) and pipe hairpin in background.

Operation of Pig Receiver Installation in simplified cover sketch: Gas flow (1) pusher spring-loaded pig ahead. Pig, in turn, pushes plug of liquids (grey). Liquids flow downward through piping connection (2) and forward. Pig continues forward pushing some fluid through full-opening valve (3) which is shut after pig has passed through. Pig moves into receiver (4) from which it is removed to repeat operation. Bypass line (5) is opened before pig removal to permit remaining liquid to drop into slug tank. Liquids (7) remain at bottom of slug tank while gas (6) moves forward under pressure through hairpin (8) and onward to main gathering line. Fluid removal line (9) carries liquids to storage tanks.

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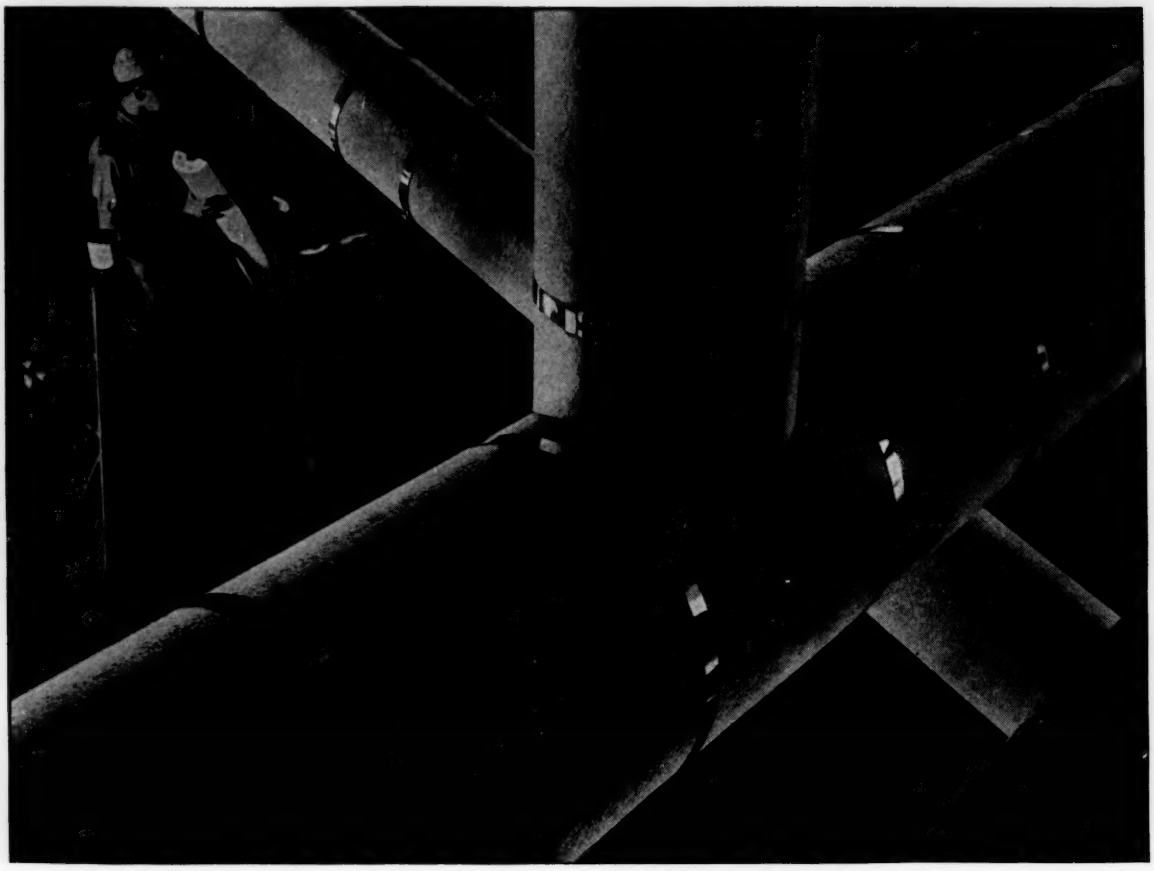

STYROFOAM® *stops moisture, repels heat*

Superior properties make Styrofoam outstanding for low-temperature pipe covering.

There are just three things most people ask of a low-temperature pipe insulation. That it . . .

(1) stop costly heat gain, (2) prevent condensation and dripping, (3) stay trim and effective without maintenance.

Pipe covering made of Styrofoam* does an outstanding job all three ways, and at surprisingly low applied cost. The reasons are: Styrofoam has a low "K" factor that stays low permanently because of this insulation's unyielding resistance to water vapor. (This is the same Styrofoam that has been so widely used as a low-temperature room insulation by leading companies everywhere during the last 10 years.)

Styrofoam is effective as a vapor seal, and will not crack or split in extremely cold or rapidly changing temperatures. It is not subject to ice build-up around valves. And Styrofoam is lightweight, easy and economical to apply. Coatings for both indoor and outdoor use are available and are easily applied in the field.

The companies listed below manufacture a complete line of pipe covering made from Styrofoam, as well as a wide variety of equipment and tank insulating segments. See them about your low-temperature pipe covering problems. Or write to Plastics Sales Dept. 2223BU10.

*STYROFOAM is Dow's registered trademark for its expanded polystyrene

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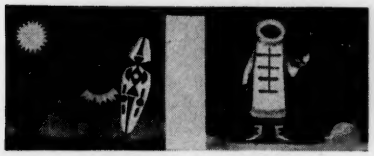
Fastab Insulation, Inc., 304 Cleveland Transit Building, Cleveland 14, Ohio • Fibrous Glass Products, Inc., Alpa Plaza, Hicksville, L. I., New York • Glo-Brite Products, Incorporated, 6415 North California Avenue, Chicago, Illinois • Kennedy Industries, 4447 Alger Street, Los Angeles, California • Kransco Manufacturing Company, 503 Railroad Ave., South San Francisco, California • MMM, Incorporated, P. O. Box 968, Portsmouth, Ohio • Robinson Industries, 3051 Curtice Road, Coleman, Michigan • Styro Fabricators, 1401 Fairfax Trafficway, Kansas City, Kansas • Styroformics, Inc., 17 Hawkins Street, Somerville, Mass. • Tuffilite, Inc., Ballston Spa, New York

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

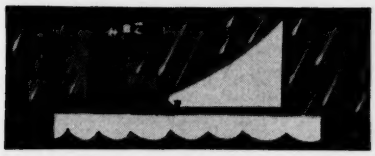
Experience proves

STYROFOAM

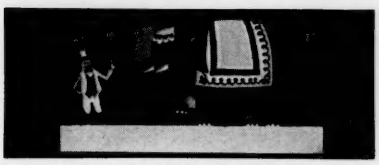
has the best combination of insulation properties



SUPERIOR INSULATION
Permanent low "K" factor



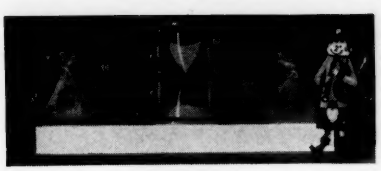
OUTSTANDING WATER RESISTANCE
Stays dry and effective



HIGH COMPRESSIVE STRENGTH
3000 pounds per square foot

EASY TO HANDLE
Lightweight, can be cut with ordinary tools

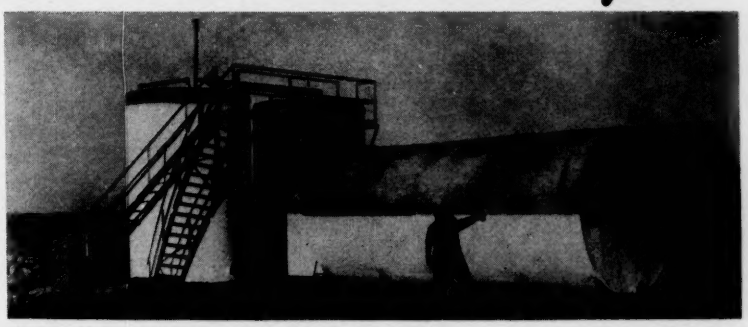
RESISTS ROT
will not attract vermin



ECONOMICAL
low in-place cost, low cost-per-year service

DOW

who needs chilled gas?



THAT AIN'T PAINT to which District 144 (Bridgeport, Tex.) foreman Lee Meier points. Frost line on storage tanks indicates level of liquids piped from slug catcher. Frost is caused by expansion of gas entrained in liquids. Upright tank on left is nearly full. Large tank holds 15,000 gal.; smaller tanks: 8800 gal., ea.

On-Stream Pigs Prevent Pipeline Ice-Jams

▶▶▶ WHEN is a pipeline like a refrigerating system, without liquid return?

Take lateral J in NGPL's Jack & Wise Counties (Tex.) gathering system: It's a 12½-mile segment of the small-diameter gathering-system "spaghetti" which transmits gas from producers' wells northwestward toward NGPL's mainline system. Like all pipelines, it follows normal dips and rises in the land contour.

But gas supplied from underlying gas fields is abnormally saturated with liquids (hydrocarbons—the "light ends" of gasoline—and water). These liquids condense and flow to these dips in the line where they remain, much the same as some water remains in U-shaped plumbing traps.

Slugging At 1000 PSI!

The collected liquids take up some of the space in the line through which the onrushing gas must pass. Result: gas pressure builds to undesirable highs (up to 1000 psi) as gas enters the restricted dip in the pipe, and falls sharply after having passed over the liquids into unrestricted pipe.

The sudden pressure drop and subsequent gas expansion causes rapid cooling and is illustrative of the principle which, applied commercially, cools beer in a gas refrigerator.

But this "refrigeration" in pipelining is about as desirable as a split seam. The cooling causes hydrates (ice crystals) to form on pipe walls and to collect downstream when ground temperatures drop below 62F.

Uncombated, the hydrates eventually would form a pipe-filling ice pack capable of totally blocking gas flow.

To remove the liquids, successful pigging procedures have been worked out by the Pipeline Division and put into operation by District 144, Bridgeport, Tex., pipeline crews under Chet Arthur, district superintendent. (Pigging is a cleaning operation. A pipe-wall-hugging plug-like device called a "pig," fitted with brushes or rubber cups, is pushed by gas pressure through the line.)

The pigging installation consists of a pig launcher, pig receiver (sketched on the cover), slug catcher (an underground vessel into which the pigged liquids flow), and storage tanks (pictured above) into which the liquids come from the slug.

The liquids are clear and evaporate rapidly—a cupful vaporizes before your eyes. Gathered in the special storage tanks, the liquids are salable to refineries where they are made into motor and airplane fuel and are used in manufacture of other products.

Mile-Long Liquid Slug!

The first pigging of the 10-inch lateral J before Spring produced 22,000 gallons of liquids which formed a mile-long pipeful pushed along by the belabored, 2-mph pig.

The lateral J pig was run twice monthly to keep the line relatively dry; but warmer ground temperatures in summer make frequent pigging unnecessary as the liquids mostly are carried by the gas in a vapor state.

Completed during the summer was installation of several pigging facilities of the J lateral type on all Jack and Wise lateral lines to preclude icing and high pressures during operations next winter.

Reprinted from BETWEEN THE LINES, company magazine, Natural Gas Pipeline Company of America, and affiliated Companies.

news briefs of the month

Frick Company Acquired By General Waterworks

Stockholders of Frick Co. voted on September 21 to accept the proposal of General Waterworks Corp., Philadelphia. An exchange of two classes of stock of General Waterworks was proposed for the assets, properties and business of the 107-year old Frick firm.

Frick has manufactured ice making, refrigerating, air conditioning, farm and sawmill machinery. General Waterworks has a one-third interest in Cochrane Corp., manufacturers of water heaters, softeners and filters, co-ownership of the Pennsylvania Range Boiler Co. Inc., a household appliance manufacturing company, in addition to their portable irrigation equipment business.

Directors of both firms had voted for the proposal prior to September 1, according to the WALL STREET JOURNAL. William H. Aubrey succeeds D. Norris Benedict as president and general manager of Frick Co. Benedict the 4th president of the Frick Co,. had asked to be relieved. Howard Butcher, III, is president of General Water Works Corp.

Return Ice Plant To Korean Owner

Recently transferred to its Korean owner was an ice plant in Pusan which had been in use by the U. S. Army since the Korean UN Police Action. Return of the plant is a result of long standing efforts by the Korean Defense Ministry to obtain transfer of properties which were commandeered during the War. The ice plant will supply ice to the U. S. Army on a contract basis.

Refrigerated Facilities For Arab LPG Terminal

Scheduled for completion in August 1960 is a new $5 million dollar plant for production of refrigerated liquefied petroleum gas at Ras Tanura on the Arab Gulf. The ARAMCO plant will be the first in the world to make LPG available for tanker shipment, according to the Arab Information Center, New York.

The new facilities will include two 80,000-barrel steel tanks for storing refrigerated LPG at atmospheric pressure, and a 22-inch pipeline to carry the liquid to Ras Tanura's north pier for tanker loading.

Stockholm Storage Plant Prolongs Fruit Season

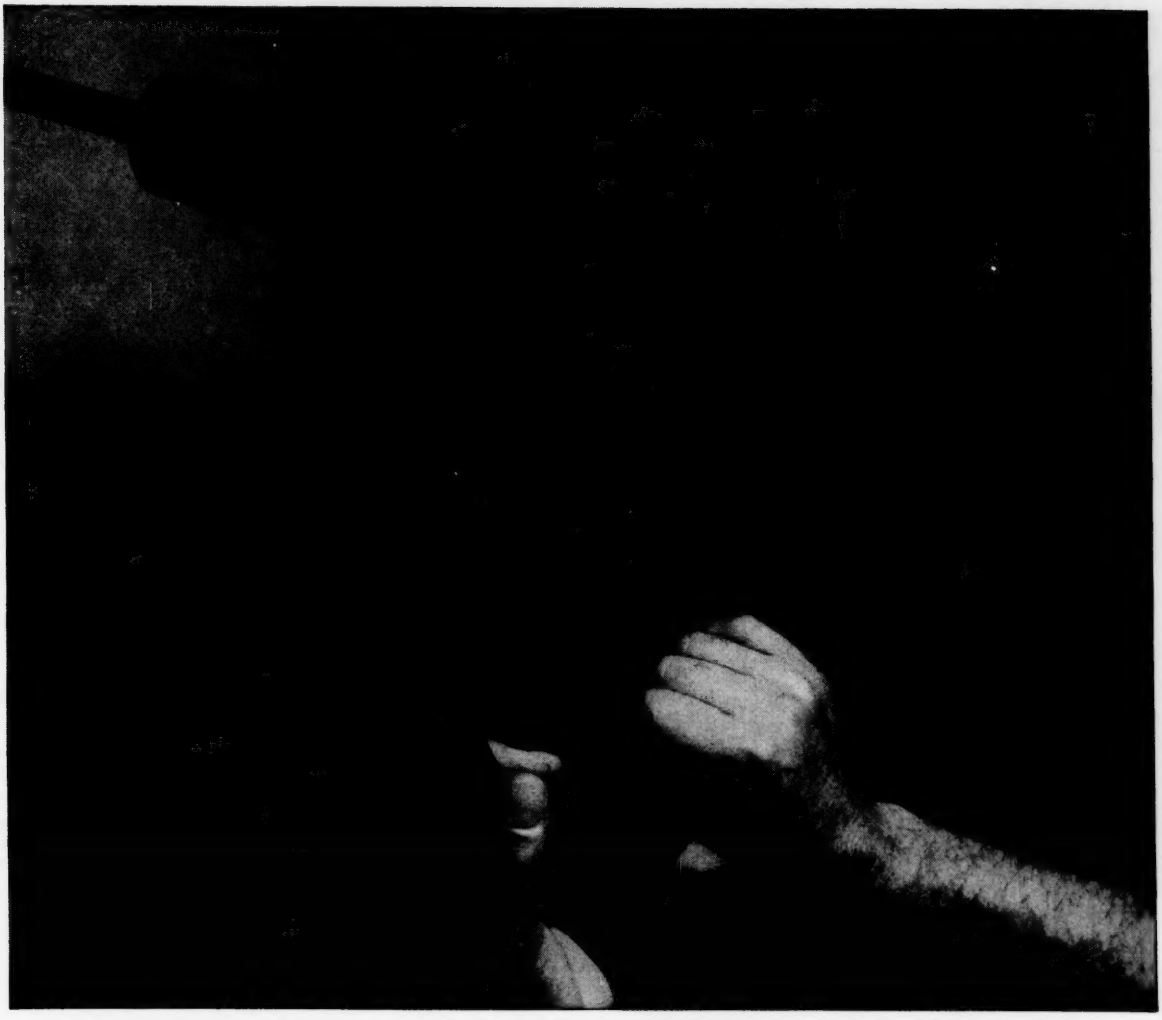
Inaugurated at Kivik, South Sweden, in August was a new fruit storage plant by a cooperative society of 60 fruit growers. Dedicated by Minister of Agriculture, Gosta Netzen, the plant has a cold storage capacity of 1200 tons and will operate at 37 to 41 F. The Cooperative credits their plant with extending the fruit preservation season by two months over previous facilities.

British Air Conditioning To Exhibit in US in 1960

Most complete display of British air conditioning will be part of a 17-day exhibition of industry technology, science and culture in the New York Coliseum next June. The Federation of British Industries is sponsoring, the British Government backing, the event.

Associations Influence Interstate Tax Fight

President Eisenhower signed Senate Bill S.2524 (the Interstate Tax bill) on September 14. Following Supreme Court decisions which allowed the states to tax incomes of out-of-state concerns, the Congress held hearings and promptly enacted legislation which is permanent in character. A number of associations representing both refrigeration manufacturing and operating firms appeared at the hearings, such as IAICM, NARW and others.

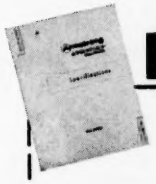


An Armstrong Armaflex specification means a low-cost, dependable pipe insulation job

A lot of pipe insulation specifications have become old-fashioned since Armstrong Armaflex was introduced less than four years ago. In that short time, this flexible foamed plastic material has moved from the specialty class to a position of major importance in the insulation field.

The reason is simple. With Armaflex you get a neater, faster, lower cost, more dependable job than with traditional pipe insulations. Armaflex is recommended for all piping operating from 0° to 200° F. It is made in three thicknesses and in sizes up to 3" IPS. Larger piping and equipment can be insulated with Armaflex sheets.

If you would like to compare your current pipe insulation specifications with the Armstrong Armaflex recommendations, send for the specification booklet today. This 12-page booklet contains complete Architects' and Engineers' Specifications and recommended Installation Instructions for the Contractor. Mail the coupon for your free copy.



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Lancaster, Penna.

Please send me complete specifications on Armaflex without cost or obligation.

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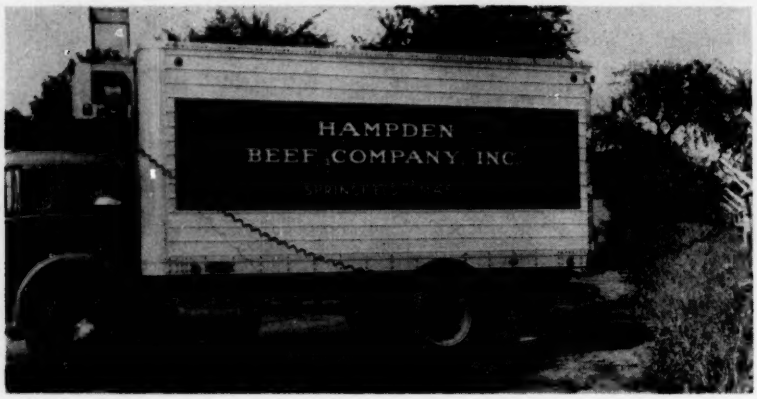
Armstrong INSULATIONS

What's New

MACHINERY
APPLIANCES • PROCESSES

Refrigerated Maintenance Tool,



▶▶ICE MAKING, food distribution, and hygiene received considerable attention from manufacturers releasing data on new equipment in the past month. Standby truck refrigeration connections, palletized food handling, built-in fluid milk cooling coils, a metal locating device and an air conditioning auxiliary prominent among the releases.

German Cuber

▶CUBE ICE development news is found in a machine made by the Neff Company of Bretten (Baden) West-Germany. Cubes made by this machine have a weight of nearly 3 oz. each and are slightly rounded off to prevent their sticking together. The machine is available in three sizes supplying 140, 280 and 420 ice cubes respectively, all within a 25 minute period.

Working automatically, the machine is encased in a white metal unit nearly six feet in height. The cubes are harvested in a large drawer which contains the ice cubes ready for use. The machines have been found especially suitable for hospital, hotels, and restaurants.

Safer, Long Reaching Koiled Kords For Reefers

▶STANDBY REFRIGERATION for truck trailers has received a maintenance saving advantage with the introduction of a new extra heavy duty *Koiled Kord*. The New Haven firm, long identified in the transportation field, has designed and marketed a 3- and 4-conductor, 12 to 16 gauge, *Koiled Kord* which meets Underwriters' Laboratory specifications. The 4-foot coiled reefer cords extend to 25 feet or more with retractability guaranteed for four years.

Springlike retractability raises cord out of dangerous contact with water, oil or grease on garage floors and transport storage lots. The firm claims that the equipment has been use-tested by over-the-road reefers, and will not dry rot or check from sun exposure. The self-coiling effect also prevents electrical hazards and damage by equipment passing over the cords as takes place with conventional hook-ups. The *Kords* may also be used with immersion heaters for vehicles stored outdoors in winter.

Pipe Locator

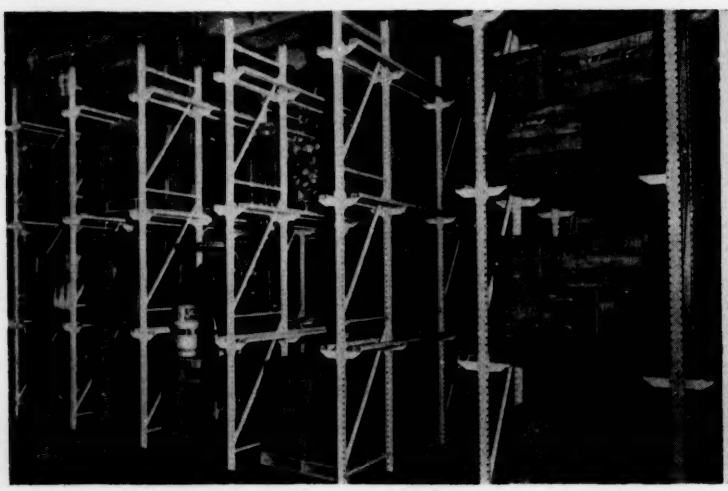
▶MAINTENANCE labor is reduced sharply in the plant where an electronic metal locator is part of the maintenance gear. An Arizona firm has recently introduced a simplified device with all controls in one small box which can be carried in the hand. The search coil is operated by means of the other hand and does not require adjustment for changes in ground level. Detection range is said to be constant regardless of the type of soil encountered. The unit may be used over salt water. The equipment is battery powered and is available either in a transistor or a tube model.

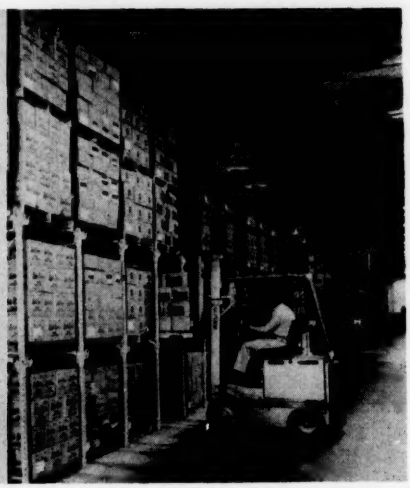
Drive-In Racks Allow Damage-Free Handling

▶PERISHABLES can be selectively and more safely stored prior to transit in a better equipped warehouse with the use of new prefabricated, fully adjustable storage racks. Developed by a Skokie, Illinois firm, these "Drive-In" *Speedracks* allow lift trucks to enter from either end thus saving aisle space.

The rack structure is so rigid that anchoring to the floor, walls or roof is not required, according to the manufacturer. Non-stackable commodities on selected pallets may be individually placed or removed from the rack making stock placement or picking very convenient.

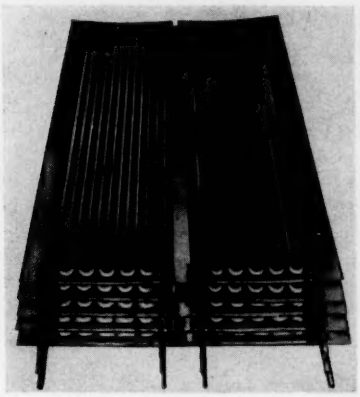
Air circulates freely around every pallet, which is important when installed in coolers and freezers. *Speedrack* is easily assembled from pre-fabricated upright trusses and load beams, without cutting, sawing or welding. It may be quickly taken down and reassembled into a new rack with differing overall height, width and depth, as the users' storage requirements change.





Food Transit, Handling Equipment Cited

Integral Coil, Air Conditioning Auxiliary Get Attention



Bulk Milk Tank Coils

▶PLATE COILS have become an integral part of the inner tank in a bulk milk cooler now being fabricated by a Lansing, Mich. refrigeration equipment producer, combining experience in refrigeration and other heat transfer fields, produces the plate coil which incorporates construction features that have proved advantageous in industrial heating and cooling operations.

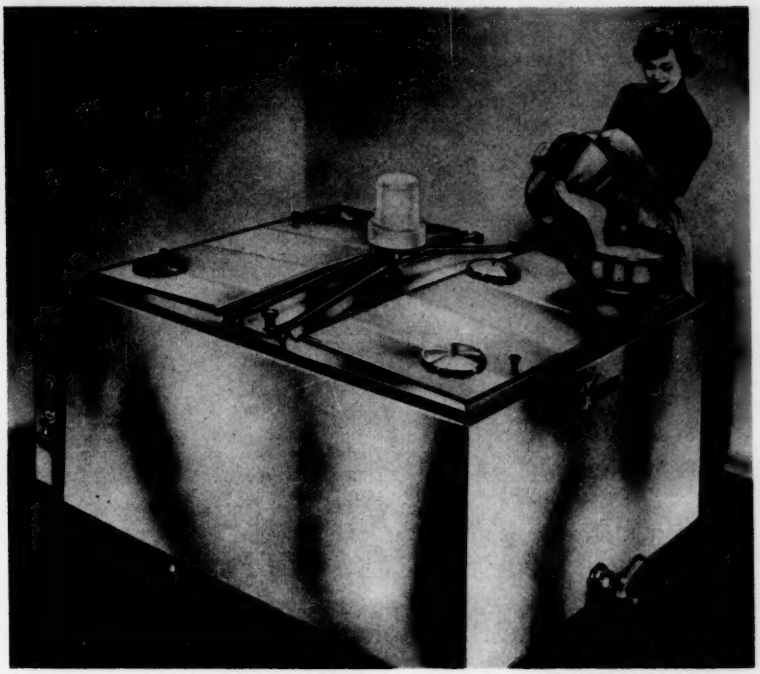
This *Platecoil* consists of two pieces of metal, one flat and the other embossed, seam-welded together. The flat piece, called the companion plate, is 14-ga. stainless steel and forms the tank bottom. The embossed plate is made of 20-ga. stainless steel and is embossed in a serpentine fashion. The raised part of the embossing makes channels through which the refrigerant passes.

There are two separate embossings, each with its own refrigerant connections, so that efficient use of the refrigerant is assured. In this design, the companion plate (the entire bottom of the tank) becomes a prime cooling surface. With scientifically designed agitation, the milk passes over the refrigerating surface, is brought to the desired temperature quickly and held there until the milk is pumped into the tank truck.

More Efficient Method

By making the refrigeration plate an integral part of the tank, greater efficiency is assured. There is no need for welding tube to the tank, and an extra thickness of metal is eliminated as opposed to welding a plate to a tank. Saving time and material in assembly effects production economics while providing more efficient refrigeration.

(The Revised Farm Tank Standard received approval by the 3-A Group at the Annual Meeting of the Sanitary Standards Committees at Glenwood Springs, Colo., in August. See page 19)



The direct-expansion type of bulk milk cooler, with remote refrigeration unit, permits tank installation in small or odd-shaped milkhouses.

With most processors operating on an every-other-day schedule for tank trucks, adequate dependable refrigeration on the individual producing farms becomes vitally important in maintaining milk to Grade A quality. In direct-expansion coolers with the new refrigeration plate, the Smyna maker is producing models of 200 to 700 gal. capacities.

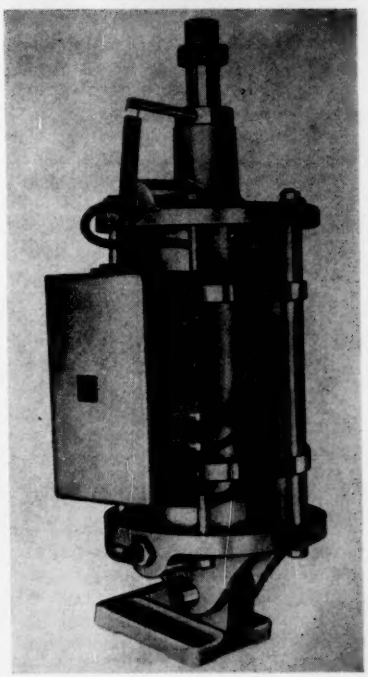
Large Capacity Control For Air Conditioners

▶COMPACT, a pneumatic motor with cylinder volume of only 126 cu in, but with 7-inch stroke and 150 ft-lbs of torque, was announced late in August by a Skokie, Ill. maker of automatic temperature controls.

Pictured above is the *Type LC* piston type motor which is 75 percent smaller than the double diaphragm motor it replaces. It can be mounted in any position to control vortex dampers, inlet vanes of refrigeration compressors, and large dampers.

Compact "Booster" For Control

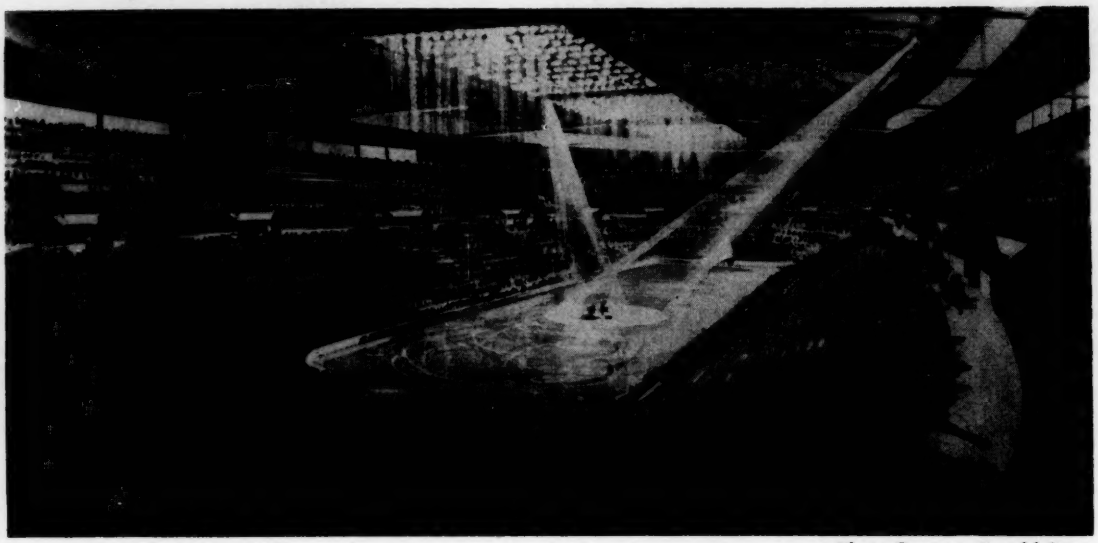
A "power package" containing a positioning relay and a reverse relay powers the motor. The relays amplify the air signal from the controlling instrument to provide the air volume necessary to move the piston and position the motor quickly.



The motor has its torque rating of 150 ft-lbs based on a 20 psi air supply, a crank radius of 5-in, and 90-degree travel. It can gradually control 200 sq. ft. of damper area up to 1200 fpm velocity.

Icing Up

by Richard Francis



—Photo Courtesy Recold Corp.

Sports Arenas And Ice Rinks Get Ready For Longer Seasons

▶▶▶ LABOR DAY, the conventional closing curtain on the summer season, seems to be a bit early in the minds of the Sunday newspaper feature writers for winter ice sport preparations. Typical is the comment by Malcolm M. Manber of Newark Sunday News, in the issue preceding Labor Day. His feature was built around the fact that the park commission engineers were already icing up two of the city's arenas for the 6-month ice sports season.

Canadian neighbors who have recently turned to mechanical refrigeration seem to think that extension of their curling season to a full six months is a longevity achievement. Perhaps the public press and trade press are partially responsible for this trend of thinking which is actually not a fact.

A review of such publications as a NATIONAL ICE SKATING GUIDE, and a hurried check with manufacturers of refrigerating equipment and ice sports contracting specialists, indicates that the longer ice sports seasons are not exactly a trend. Rinks which operate the year round have been a fact for many years and are on the increase. Metropolitan areas like New York City, Chicago and St. Louis have had one or more of their public ice sheets in operation with few lapses.

Typical of the newer installations is the University of Denver arena. This rink operated all summer. From the standpoint of equipment, accessories and supplies required, it is probably of industry interest to note that $120,000 was spent for water, brine, ammonia, heat and electricity, plus some additional pipe and equipment. Ice sports, therefore, whether operated seasonal or year-round, cannot be termed as small business.

Portables New?

In addition to the permanent rinks there have been a skyrocketing number of new developments of in-season portables for the suburban or rural communities. The portable ice rink business is not exactly considered a little brother to the permanent installation either. Consider the large traveling ice shows like "Holiday On Ice." These enterprises amount to an equipment caravan and have developed into a year-round business which is international in scope.

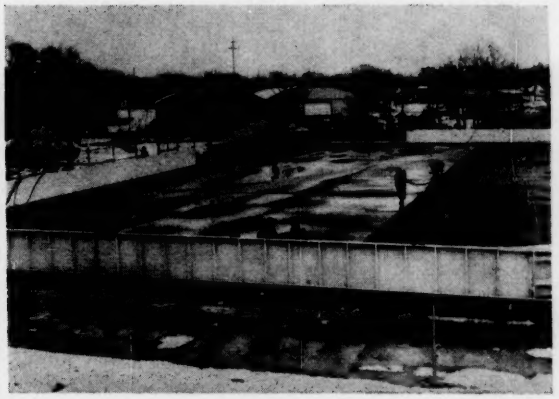
Air Conditioning Aids Indoor Ice Sports

Air conditioning has contributed some to the popularity of indoor ice sports, and is necessary in winter as well as summer in many locations. As yet there has apparently been no attempt to measure how much air conditioning has contributed to the popularity of these sports but it is significant to note that many of the arenas, which had formerly used ice rink equipment only, are now equipped for air cooling.

Among the newer rinks, like the Los Angeles, California Memorial Sports Arena, or Greensboro, S. C. Coliseum, certain portions of the refrigerating plant are interchangeable for ice making or air cooling. The latter mentioned, will open October 29 with an ice show. Thereafter, it will be a year round center for sports, entertainment, conventions and shows, with the ice sports estimated as being among the more popular events.

Perhaps the nation's leading hotels, like the New Yorker in Manhattan, and the Conrad Hilton in Chicago, should be credited with the introduction of air conditioning for indoor ice arenas. Air conditioning was a must in many of these hotel installations where meals are served and the ice sheet used predominantly for entertainment of the guests rather than their participation. Just how to classify the hotel rink—permanent or portable installation—is somewhat baffling, as the rink is usually retractable to provide a dance

Taken while the rink was under construction, this view shows 50,000 ft. of Spang CW Steel Pipe used as a brine grid for the Robert N. Daley, Jr. Ice Rink. Built by the Charles R. Beltz Company, Detroit, the rink is situated on the grounds of St. Sebastian's Country Day School, Nonantum Hill, Newton, Mass. Designers and contractors of permanent rink still show a preference for steel.
—Photo Courtesy National Supply Corp.



Kalamazoo's Parks Department has achieved high utility in the design of a new rink pictured here. Small work crews can lay or remove the plastic pipe in one day, making the rink available for roller skating or dancing. Little of the refrigerant brine is lost when this rink is dismantled as the brine within a 185-foot loop remains in the plastic tubing when stored in a trench next to the rink.
—Photo Courtesy United States Steel Corp.

floor area. Perhaps a description from the transportation industry might be appropriate: should they be called roll-on and roll-off, or slide-on and slide-off? (We will be accused of punning for that last remark.)

Some Ice Installations Utilize Heat Pumps

Heat pump applications are finding favor with the designers of more permanent rink installations. Many rink attendants prefer hot water for resurfacing. Also, in colder climates, heat is required for dressing rooms, refreshment and comfort areas. What's more logical than to take the heat out of the ice, and use it to preheat water for resurfacing and for comfort heating purposes?

For the Olympic Games to be held in 1960, a heat pump has been designed and is now in operation at Squaw Valley, California, according to York Corp. officials. This will probably be the largest non-reversible heat pump application in the United States, possibly the world. Heat will be withdrawn from various ice sheets and other sports areas and used with waste heat from other mechanical apparatus for snow melting on the sport's facility roof. Span of the roof is such that a snow load would soon collapse the structure. The heat pump will operate continuously to keep the snow melted off that critical area. When not required for snow melting the heat pump can be applied to other heating requirements.

Modern Developments

New materials found favorable in other refrigeration applications are also popular in the ice sport field. For example, polyethylene film for natural and refrigerated ice sheets, portable or permanent in nature, has become very popular. Polyvinyl-chlo-

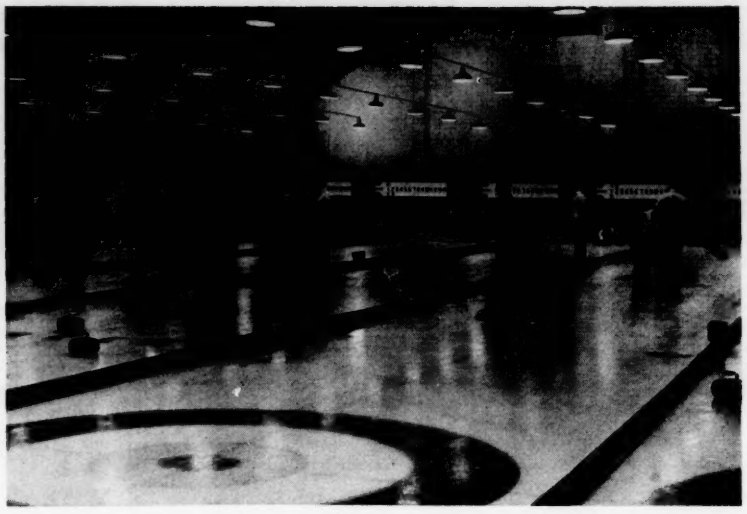
(Continued On Page 39)

(In November, INDUSTRIAL REFRIGERATION will briefly review some of the new materials and construction techniques and cite a few applications. Construction practices will be mentioned similarly. In December, another short feature will mention the techniques employed by the operators in maintaining the surface.)

Water leakage from a rink surface can be considerable during initial flooding, thaws and surface preparation. Probably the most inexpensive barrier yet developed is a .004-in. thick polyethylene film such as this, applied at Jesup, Iowa. The film is especially adaptable to temporary or portable installations.

Close-up of Jesup installation shows how the plastic film is brought up and over, and held in place by a 1x4 strip.
—Photo Courtesy Spencer Chemical Co.

Curling



Pembina curling club has no trouble keeping its six sheets of artificial ice busy all though the week. Curlers take pride in their individual rinks and wear heavy wool cardigans with their own designs as identifying badges.

By GEORGE LEGRIS
Special Correspondent
Winnipeg

Canada's Big Winter Sport Now Relies On Artificial Ice

▶▶▶ ARTIFICIAL ICE has overcome unpredictable winter weather in many western Canadian communities, where curling *bonspiels* attract continuing interest from November until Spring. In Winnipeg, capital of the western Canadian province of Manitoba, the Pembina Curling Club ended its regular winter season in the fourth week of April 1959, a good month later than in previous years. The reason: new artificial ice surfaces—six sheets in all.

Curling has grown rapidly in Canada in recent years. There are an estimated 200,000 Canadian curlers compared with 60,000 ten years ago. If the game was proportionately popular in the United States, it would draw about two-million active players—men, women, and youngsters.

The growing interest in the game has lengthened playing schedules and created a steady demand for artificial ice in all ten provinces from Newfoundland to British Columbia. One of the leading makers of refrigeration machinery in Canada reports that they have in the past half dozen years, installed 450 ice plants in rinks in all ten provinces, and there's more business in sight.

The Pembina Curling Club switched to ice-making equipment at a cost of $23,500 for the machinery and six sheets of ice.

The six sheets, each 146 feet long and 14 wide, took more than eight miles or 43,000 feet of steel pipe requiring more than 2,300 leak-proof joints.

Club System Installed During Remodeling Program

Since the rink building was being re-modelled at the same time, general contractors had first to prepare a base of sand and gravel across the arena before the piping for the cooling fluid could be laid.

The builders next installed wooden separators between the ice sheet areas, and ran 3 by 4 inch creosoted wooden sleepers crosswise every four feet.

After the sleepers had been checked to make sure they were level, spacers were hammered into them to hold the lengths of pipe 3½ inches apart. The piping was then laid across and welded.

Separate Machinery Room

An annex built on to the club building houses the refrigeration machinery, a model structure used by Cimco[1] for several years. Known as the Cimco Balanced Charge system, the ammonia refrigeration system is completely separated in action from the cooling brine circulating under the ice surface. The brine is a calcium chloride solution.

Since ammonia fills the cooler only to the level that floods all cooling tubes, there can be no over-feeding if controls fail. This eliminates the danger of compressor damage from boiling over.

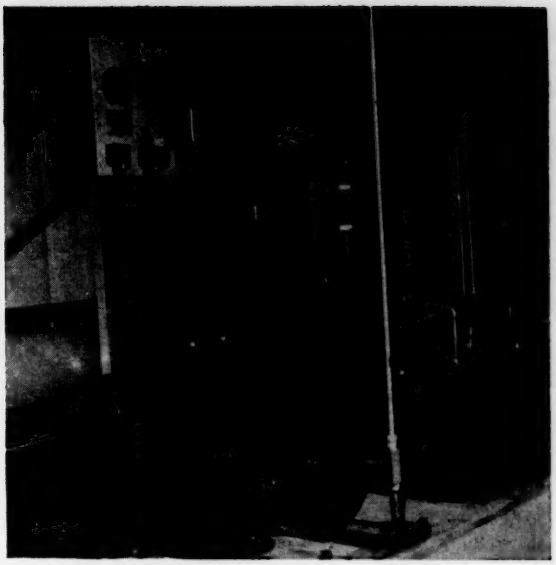
The refrigeration machinery consists of a six-cylinder compressor driven by a 40-hp., 3-phase, 550-volt motor with a reduced-voltage-type starter; the ammonia condenser is a horizontal shell-and-tube model with a water valve metering the quantity needed to maintain economic operating pressures; the brine chiller is also shell-and-tube construction, insulated with three inches of cork and encased in sheet metal.

The brine solution is forced through the 43,000 feet of piping by a centrifugal pump driven by a 10-hp. motor. The pump can handle 460 gpm at a 40-foot head.

Automatic controls protect the system if water flow through the condenser should be cut off, or whenever high or low pressure, oil failure, or erratic temperature variations may occur. Ice temperature is kept between 19 and 23 F—best temperature for curling—by thermal controls.

[1]Cimco: Canadian Ice Machine Co.

Workman in foreground measures out spacing strips to hold coolant pipes. Other worker fastens strips on wooden sleepers laid across sand and gravel base.



Ice-maker Ray Slagerman looks over guage board in new machine room. In foreground: 40-hp motor and compressor behind panel, NH_3 condenser and brine chiller.

Welders use acetylene torches to close elbow joints at headers for pipe carrying calcium chloride under the ice surface. Eight miles of piping took 2,300 welds. Entire refrigerating job and rink construction took about eight weeks.

—Photos By George Legris

Surface Preparation Requires Skill

Ice-making or surface preparation itself is something of an art. At the Pembina rink, it's handled by Ray Slagerman, who farms outside Greater Winnipeg. Having no cattle, he is free to make ice in winter.

After the first flooding in the fall, the ice surface is colored white by adding Keene cement. A scriber is used to trace markings, such as rings and lines, with colored ice paint added afterwards, and an extra sprinkling for protection.

"You learn to make ice by experience," says Mr. Slagerman. "Curling is just now starting to catch on in the American midwest. Last winter, for example, a new rink in North Dakota got in touch with me for advice. They hadn't been able to find an ice-maker in five states."

Mr. Slagerman has learned by trial and error how to overcome the main problems: uneven spots caused by wear from the curling stones, and shaling and thawing.

Overcoming Ice Defects

"Sprinkling with a fine-spray surfacer", he explains, "is the way to overcome ice wear."

"For shaling, you may have to scrape the ice in bad spots, because adding water won't fill in bubbles or weak patches.

"As for thawing, that's what ice plants are designed to control."

An All-age Sport

Curling, especially in the western provinces, attracts people of all ages. Youngsters in the province of Saskatchewan invented jam-pail curling on schoolyard ice, using tins filled with water which were left standing outside. Among the adults, provincial champions set their sights on the MacDonald Brier trophy at national playoffs in March.

Canada now has a national high school championship, a women's bonspiel crown in the west, and local bonspiels in almost every prairie town and village, where curling is often more important than hockey.

Manitoba has the world's largest bonspiel. In 1958 the 71st, it attracted 458 rinks from all over the province, and a few from North Dakota and the Minneapolis area.

The annual bonspiel in February gave birth to a household phrase in the Canadian west—"the bonspiel thaw" that seemed to link the tournament with slushy roads and melting snow. In past years, the warming weather often meant rubbery ice and disrupted bonspiel schedules for Greater Winnipeg rinks.

Artificial ice was the answer. Rinks turned to ice plants to beat the weather as soon as they could afford it. They raised money with raffles, club socials, and in the bigger groups, interest-bearing debentures sold mainly to enthusiastic members.

Now A Six Month Season

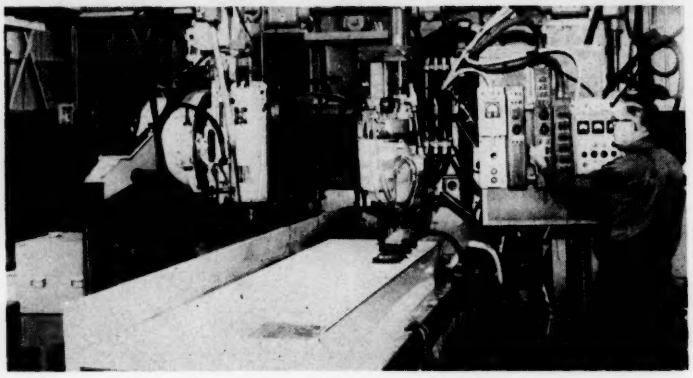
With natural ice, curling gets under way in December and ends with the early spring weather. With artificial surfaces, clubs plan a definite six-month schedule from November thru April.

Even curling clubs in the small prairie towns are turning to ice-making equipment. Manitoba alone has 350 curling clubs, 23 of them in the Winnipeg area. Nineteen of these Greater Winnipeg rinks provide artificial ice, or 88 sheets out of 103. In the 1958 season, 59 Winnipeg curling sheets were machine-made.

Western Canadian curlers predict that the old natural ice rinks will gradually disappear even in the farm communities, because, they say, curling is everybody's game and refrigeration assures top rate sheets.

ICE CHUCKING FOR MACHINE WORK

By THOMAS A. DICKINSON



Typical North American Aviation honeycomb machining setup with refrigeration "ice chuck" positioning several pieces for work.

▶▶▶AN UNUSUAL refrigeration technique is enabling North American Aviation, Inc., Los Angeles, to support relatively flimsy honeycomb core materials so that they can be machined to a variety of precision dimensions.

Honeycomb materials in this case are made by welding thin metal foils; and, as their name implies, they resemble structures produced by bees. When properly machined, they can be sandwiched or laminated between layers of solid sheet metals in the production of aircraft parts with high mechanical strength and exceptionally little weight.

It is possible to stiffen honeycombs by filling them with such low-melting materials as wax and lead-bismuth alloys, but this creates a costly cleaning problem following the machine fabrication of cores.

"Ice Chucking," as North America's process is known, consists briefly of filling a core with water and solidifying the water. This makes it possible to clean a core after it is machined simply by melting the ice, and then using compressed air to blow out residual water droplets where rapid drying action is desirable.

A Five Minute Operation

Each chuck is simply a large rectangular container similar to the ice-cube tray in a standard household refrigerator. Channels below its bottom surfaces are used to circulate glycol from a refrigeration coil in such a way that chuck-retained water, to which a jelling agent has been added, can be frozen in three to five minutes.

In some cases, a vacuum line and rubber membrane vacuum bag are used to maintain contact between chuck surfaces and a honey comb workpiece during the refrigeration process.

Following a machining operation, glycol can be circulated through a heating coil and the channels beneath the ice chuck to accelerate ice melting.

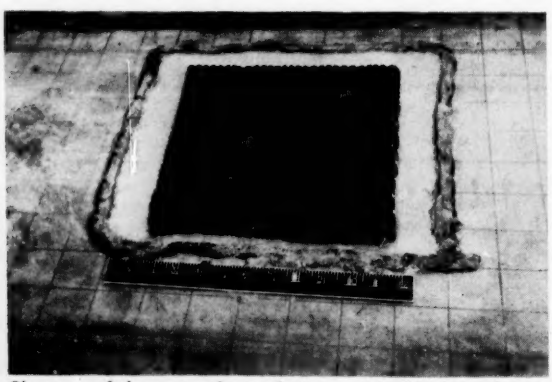
It might seem that ice chucking would not be necessary where honeycombs are machined by means of new electrical and electrolytic methods, since neither of the latter processes makes it necessary for a cutting tool to come in contact with a workpiece. However, North American engineers claim it would be almost impossible to maintain the proper alignment of a honeycomb workpiece during either process if the workpiece's base weren't embedded in ice due to relatively small forces which could result in substantial movements of lightweight materials.

Refrigeration Sets Up Low-Melt Alloy Chucks

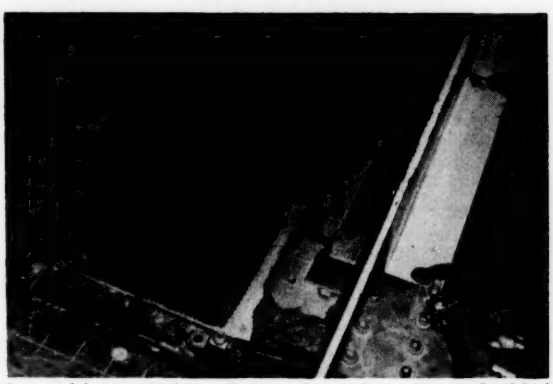
In a few instances, where it has been necessary to use so much current that ice around a workpiece could not remain melted, North American has reversed its standard chucking technique to permit the use of low-melt alloys in place of water.

This involved, first, the circulation of heated glycol so as to melt the alloy positioning medium; and, second, the circulation of refrigerated glycol to accelerate the solidification of the molten metal around the base of a honeycomb workpiece.

A typical refrigerating unit for North American's ice chucks is a 30-TR Almar-York product.

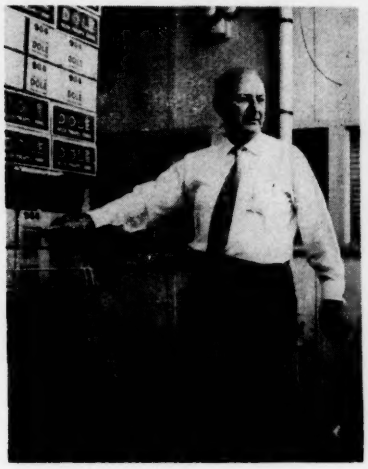


Closeup of honeycomb workpiece embedded in frozen water on one of North American Aviation's ice chucks. Less than five minutes setting is required.



Base of honeycomb workpiece shown here was embedded in a low-melting alloy by using a "refrigeration" chuck to melt and then to freeze the positioning medium.

HAWAIIAN COLD STORAGE EXPANDS



Mortimer J. Glueck, owner, Hawaiian Cold Storage Co. calls attention to the description on a lot received.

Palletized frozen product of the Islands is stored for export to the mainland, USA. With adequate door heights, this operator stacks the pallets as they come off the refrigerated vans and moves them directly to storage.

Goes After Volume Refrigerating Expected by 50th State Businessmen

▶▶▶ FAVORABLY HIGH, even temperature and predominating sunshine may bring a flourishing tourist business to the Hawaiian Islands, but it certainly produces a great many problems in refrigeration for perishable food handlers. Cold storage warehousing conditions are complicated by three hundred and fifty days of sunlight every year, and by the geographical location near the tropics.

Under such climatic conditions, many products such as flour and popcorn, which do not require refrigeration in the Continental U. S., become infested quickly in the 50th State unless kept cool. Most refrigeration is required of course for frozen foods, fresh fruit, meat and vegetables. It is necessary for handlers of these items to not only provide adequate refrigeration, but also handle them rapidly to prevent combined sun, temperature and humidity from damaging them. In addition, although local labor is not extremely high priced, materials and equipment for refrigeration and insulation imported from the mainland, as well as electrical power, can be very costly if not controlled and supervised.

Civilian Pursuits Expand

Recent construction of a brand new $300,000 warehouse for Hawaiian Cold Storage Co. in Honolulu, solved some of these problems. The firm, owned by Mortimer J. Glueck has the second largest civilian cold storage facilities in Hawaii and the first designed for mechanical cargo handling equipment.

The new structure was built by Camping Construction Co. of Oakland, California under the guidance of Horace Hicks, Construction Superintendent. Design choice, modified *Quonset*, was by Glueck himself. The building is 180 feet long, 80 feet wide and 32 feet high. It is divided into freezer and chill sections, with the freezer portion taking up 78 percent of the building.

Hawaiian Cold Storage Co. is the first major refrigerated warehouse to be built on the island in 39 years and represents a doubling of Hawaii's available cold storage space. Many island businessmen can now carry adequate supplies of perishable foods economically, for the first time, according to owner Glueck.

Direct Expansion System Employs Refrigerant 12

For initial cost saving and long-run operating economics, respectively, Mr. Glueck decided on making use of refrigeration compressors which he already had and then adding a booster unit to permit two-stage operation. After checking with several local refrigeration engineers, an FES-Fuller rotary compressor was added to the system and on low stage maintains the temperatures in the freezer at minus 10 F without strain. The system uses Refrigerant-12 and is equipped with a liquid recirculation system.

With this refrigeration system, Hawaiian Cold Storage Co. can successfully store cased retail and institutional packs of frozen foods, such as fruit, meat, vegetables and dairy products in the large freezer room, while such items as popcorn, peanuts, flour and macaroni plus various local fruit and vegetables can be kept at a cool temperature in the smaller chill room. Also, the company is now storing for export, juices and fruit for local plantation owners, thus increasing their business and making use of their larger space and heavy duty refrigeration.

Expanded Polystyrene Insulation Selected

In engineering the construction of the new warehouse, Glueck and his construction advisers decided on the use of *Styrofoam* (a plastic foam manufactured by the Dow Chemical Co.) for complete wall and roof insulation because of its well known insulation properties, strength, lack of weight and ease of installation. Previous experience with other forms of insulation had been less than completely successful for his firm, and he felt that the boardform foamed polystyrene material could accomplish complete insulation desired.

In some of the accompanying photographs, the procedure of insulating the new warehouse is shown

More on Page 17 ▶

Polystyrene Application Procedure Used For Hawaiian Cold Storage Co. Erection

Honolulu construction trades erected the insulation at the Hawaiian Cold Storage Co. Here the vapor membrane is asphalt bonded to the compacted fill flooring, turned up and cemented to the plywood walls. The first course of wall insulation is set against the membrane and the first course of the floor perimeter insulation is hot mopped.

Roof insulation was escalated to its point of use, one labor saving feature. Another saving was effected by pre-cutting the insulation board to 4½-ft lengths, enabling workmen to quickly fit the material to the roof contour.

Coating the contact side of an insulation board was accomplished with this "Roll-Coater". Coating sheets in this manner, rather than by dipping, reduces probability of board shrinkage should kettle man allow adhesive to overheat.

First layer of roof insulation is bonded to ¾ inch plywood deck with hot asphalt and additional fastening with galvanized roofing nails. Approximately 175,000 board feet of *Styrofoam* were installed for low temperature insulation. Thickness pictured here is three inches. Conventional hot-mopped roof membrane was applied over the insulation.

Refrigeration engineers will recognize the insulation transistion between cooler and freezer compartments, in this view. Two 2-in layers were employed in the cooler; two 3-in layers in the freezer storage.

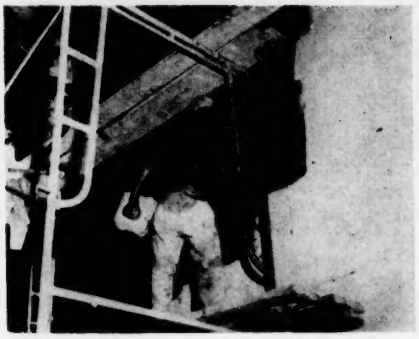
Second 3-in layer of insulation is applied to the first roof course with conventional hardwood skewers.

Hawaiian Cold Storage Expands—

Applies Polystyrene Insulation

Employs Two-Stage Recirculating Refrigerant-12 System

Owner Glueck and Horace Hicks, construction superintendent, inspect the polystyrene application in the cooler. Insulation board is Dow Chemical's *Styrofoam*.



Applying scratch coat of Portland Cement mortar to the cooler room insulation. The finish coat is applied next to complete the surface.

clearly. Two layers of 3-in thick insulation were applied in the freezer room and two layers of the 2-in thick material were applied in the chill room. For added protection, the insulation was also extended six feet onto the floor from each wall. (Otherwise the floors were un-insulated). On the surface of the foam plastic was placed a layer of scratch coat Portland Cement mortar and then a finish coat for surfacing.

The first layer of roof insulation was bonded to a curved plywood deck with hot asphalt and fastened with roofing nails. On top of this was placed a second layer of Styrofoam and, like the wall insulation, fastened with treated hardwood skewers. A conventional roofing material was secured directly to and over the roof deck insulation.

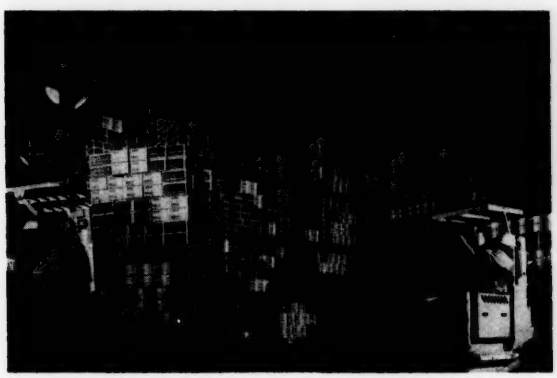
Operating Efficiency More Than Expected

Power cost was estimated at $1,800 per month when the new building was designed, but subsequent operation with the polystyrene insulation and the rotary boosted Refrigerant-12 system both functioning effectively, has shown power costs at only $900 per month. This cost also included charging of electric truck batteries daily—usually a rather high kwh producing factor in itself.

Of three high-stage machines available, only one reciprocating primary and the booster have been used. Up to 12 million lbs. have been held under refrigeration by these machines at temperatures as low as 10 F. The rotary has a two-speed drive, which with added high stage units affords an additional 20 percent capacity. Two other reciprocating units may be used on the high temperature cooler space in the event that freezer holdings would require the entire two-stage output.

Business is improving for Hawaiian Cold Storage Co. It recently contracted with Hawaiian Pineapple Co. to store up to four million pounds of frozen pineapple and pineapple juice. The company advertises that in large quantities some products can be stored for 1.1c/lb. The new cold storage warehouse is ideally situated, lying adjacent to the port of Honolulu and Hawaii's military installations. The warehouse fronts on the Oahu Railroad which is planning roll-on, roll-off service.

**(Photos Courtesy of:
The Dow Chemical Co., and
Freezing Equipment Sales Co.)**



Frozen pineapple chunks are stacked in the freezer. Stacked four pallets high, the load reaches to approximately 16 ft. Truss mounted air handling units distribute refrigerated air over and downward through the product.

View of the double-leaf electro-mechanically operated cold storage doors used in this plant. Warehouse dispatcher's office is pictured in center and machinery compartment is in the louvered area under the condensers.

Milk Heats Water

Practical Heat Pump Application

▶▶▶ REFRIGERATION SYSTEMS used for bulk milk tanks are actually heat pumps which transfer heat energy to a coolant, Agricultural-Engineer M. C. Ahrens told the Golden Anniversary meeting of the American Society of Agricultural Engineers two years ago. The challenge, he said to the engineers, is to make practical use of the heat energy, removed from warm milk in the cooling process.

Ahrens was reporting on early tests which indicated the feasibility of using heat energy or milk cooling to preheat the wash water required after each milking. Practicability of the application after subsequent tests, prompted publication of a USDA Agricultural Bulletin on how to make a milk cooler heat water. Ahrens is the author of the Bulletin published in May, this year.

Modern milkhouses, according to Ahrens, have at least two requirements for heat; water heating and space heating. It seemed only naturally to him that the refrigeration unit used to cool large quantities of milk should be harnessed and used as a heat pump to supply some of that heat in a milkhouse. Information available to him indicated that most common bulk milk coolers on farms were 200 and 300-gal. Although he anticipated that the typical cooler of the future would be closer to 400-gal size, and he actually based his experiments on a 400 gal vessel, his report was pointed to the savings which could be accomplished with a 200-gal tank.

In one year, a tank cooling 200 gals of milk per day will extract heat energy equivalent to more than 9,000 kwh. Those are the figures which the agricultural engineer used as his basis for potential savings in employing the heat pump in the milkhouse.

Test Considerations

Procedures employed in making the test was described by Ahrens in a paper he presented two years ago. He described the variables, equipment and operation. However, the ARS report does not include that data but merely is a description of how to hook-up auxiliary equipment and controls between the milk cooler and water heater in order to accomplish the heat pump application. Variables considered were the temperature of the preheat water, milking rate, and the amount of hot water used.

Equipment included a 400-gal direct expansion tank with a 2-hp remote compressor, designed for every other day tanker pick-up. An air cooled condenser and the water cooled condenser were in parallel. Control by solenoid valves in the compressor discharge line, determines which condenser operates.

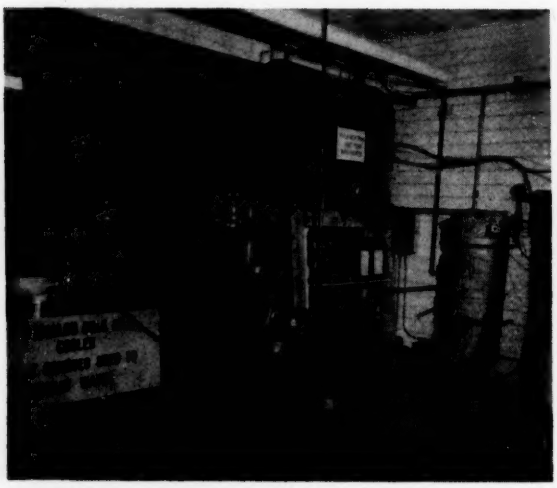
Air temperatures below thermostat settings called for heating by operation of the air cooled condenser. Higher temperatures in the milkhouse called for operation of the water cooled condensers. Ahrens outlined for his intial audience, the fact that maximum economy would be achieved with the omission of the air cooled condenser. His experiments were confined to the water cooled unit and the subsequent ARS Bulletin also omits the air condenser.

Results Summarized

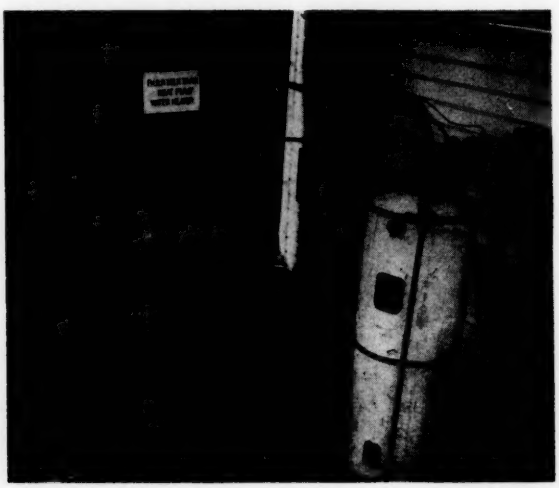
Results of the project by Ahrens showed that a 400-gal direct expansion milk cooling tank equipped with 2 hp compressor, and with every other day pick-up, a savings of 4,000 kwh per year can be obtained. The savings is made by preheating water at a supplied temperature of 55 F to 120 F, and using 50 gallons of wash water after each milking. This amount of wash water was considered average and because of that factor and the test findings, it was recommended that the preheat tank be of equal capacity to amount of wash water used. Test results also showed that there was very little reduction in cooling capacity of the compressor operating as a heat pump.

Reports Available

See Next Page ▶



Pictured is a 400-gal bulk milk cooler used in the heat pump experiments at the State College, Pullman, Wash. Refrigeration condensing unit used as a heat pump is located at the base of the frame structure, center. Wash water preheater is the vertical vessel with the insulation.



This view of the experiment shows a bulk fuel vessel which was used to heat water to milking temperatures. Water was then transferred to the bulk milk cooler to simulate warm milk entering the bulk tank. In right foreground is a standard water heater used for wash down.

More: Milk Heat Pump

M. C. Ahrens is now located with the Agricultural Research Division, Plant Industry Station, Beltsville, Maryland having been assigned for the heat pump experiments to the Department of Agricultural Engineering, State College of Washington.

Reports Available

Reprints of "Bulk Milk Cooler Heats Water" from AGRICULTURAL ENGINEERING, the Journal of the American Society of Agricultural Engineers, and "How to Make Your Milk Cooler Heat Water (ARS 42-47)" are available.

Farm Tank Standard Gets 3-A Approval

▶▶ COMPLETE AGREEMENT on the revised 3-A Sanitary Standard for Farm Milk Cooling and Holding Tanks was reached at the regular semi-annual meeting of the 3-A Sanitary Standards Committees in August. Action was taken which advanced new or revised standards for eight other items of dairy equipment. In 12 months following this signing, all tanks which bear the 3-A Symbol must conform to the new standard.

Produce Terminal Buys Consolidated's Aaron Div.

▶▶ PRODUCE TERMINAL Cold Storage Co., Chicago, recently confirmed rumors that its expansion program included the purchase of E. A. Aaron & Bros. from Consolidated Foods Corp. W. A. Sizer, chairman of Produce, stated that this purchase was the first step in a diversification program.

The acquisition includes the driver-sales route operation conducted by the Chicago Frozen Food Division. It was reported also that the Aaron Division will handle deliveries of frozen foods to the many Cardinal and Royal Blue retail grocers within a 45-mile radius of Chicago. These retailers constitute a voluntary group with Consolidated.

Another Baker Presidency

W. C. Baker, president of Produce Terminal (and also president of NARW), has also assumed the presidency of Aaron. Other new Aaron officers are Peter W. Mitchell, executive vice-president; Byron Nelson, vice-president in charge of sales; Milton Stern, secretary; Charles Peterson, assistant secretary, and Leonard Jacnicki, treasurer. Edward Aaron formed the company in 1885. A leading distributor of frozen foods in the Chicago area, this company has been a division of Consolidated Foods for the last five years.

(It was observed by an IR staff member that the Produce Terminal acquisition of Aaron, further confirms a theory that a trend exists on the part of refrigerated warehousemen to enter into other links of the refrigerated distribution chain—a move to offset the trend among the large grocery chains to control within their own organization, the major links in producer to consumer distribution.

Private To Public Switch

▶ WITHOUT identifying the chain, NARW's COLD FACTS in August, reported that a Midwest Grocery Chain operating 24 retail outlets, had changed back to public warehousing for storage, break-up and delivery service on frozen foods. It had previously used its own facilities for the services. Reasons for the change were that this retail establishment was unable to consolidate all its frozen food operations under one roof, including storage and delivery of frozen meat and poultry with the frozen foods.

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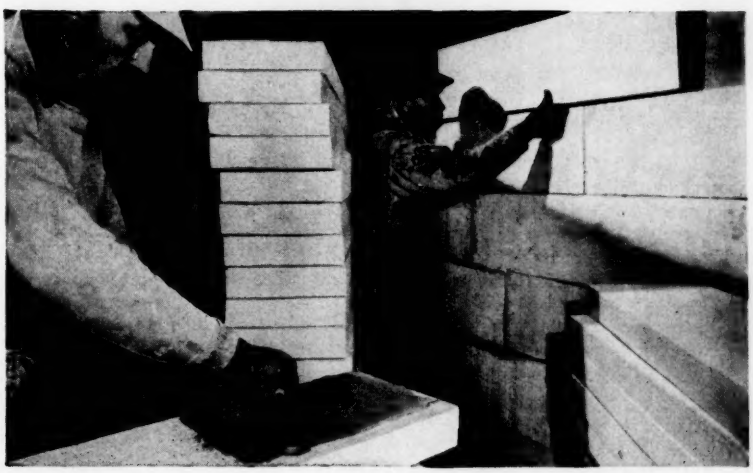

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REFRIGERATED WAREHOUSING SEMINAR

San Francisco Meet First of Regional Series

PROMPTED BY NEW CODE?

▶ Provisions of the new code adopted by the Association of Food and Drug Officials of the United States recently, in the opinion of this publication, possibly prompted the subject matter for this first regional TRRF seminar. Public refrigerated warehouses have already established their reputation for handling this particular type of commodity exceptionally well. Their foresight in implementing a program for broadening employee training in readiness for the AFDOUS code as it is legislated in various areas of the country, is to be commended. As a prominent person in the industry recently stated to INDUSTRIAL REFRIGERATION, "It is hoped that all segments of the frozen food industry will now stop quibbling about the code and get down to the business of properly handling frozen food," TRRF is leading the industry in putting across the "know-how."

▶▶▶ PROPER HANDLING of frozen foods, especially in the interest of improving services to packers, distributors and consumers, is the purpose of a new series of regional seminars scheduled by The Refrigeration Research Foundation. First such seminar in the series was held at the Hilton Inn, San Francisco International Airport, September 22 and 23.

Foundation President Millard W. Young, president and general manager of National Ice and Cold Storage Co., said that the series to be held in the various food production and distribution areas throughout the United States, would impart information and data compiled by the Foundation from its many supervised research projects. The seminar at San Francisco was presided over by Dr. Walter A. Maclinn, Managing Director of the Foundation.

Assisting Dr. Maclinn was Dr. Robert L. Olson and Dr. I. C. Feustel, also A. A. Klose, all associated with Agricultural Research Service, Western Utilization Research and Development Division, USDA, Albany, Cal.

Approximately 50 operating refrigerated warehousemen from the West Coast attended. Jack Dawson, manager, Pacific States Cold Storage Warehousemen's Association, assisted with the arrangements and participated in the program.

Streamline Planning

Related to Time-Temperature-Tolerance, as they apply to proper handling of frozen foods, the sessions consisted of two half-days. By utilizing the afternoon of the first day and the morning of the next, most attendants lost only two working days total from their business duties. Presentation of information augmented by visual aids, was made by the various speakers to the first session. General discussion of these topics, was the second day feature.

Correlating Test Reports To Practical Handling

Temperature and Frozen Food Damage was the discussion title by Dr. Olson. He demonstrated the damage which improper handling and storage temperatures can do to frozen foods. Colored slides prepared during the TTT tests at Albany were used in the presentation. Temperature Determination in Frozen Foods was discussed and demonstrated by Dr. Feustel. Techniques for making stem thermometer determinations in cases of frozen foods was explained.

Foundation Director Maclinn discussed Protection of Frozen Food from Temperature Damage. He modestly described his presentation as an attempt to correlate the Time-Temperature-Tolerance work of WURRD, with practical handling on a public refrigerated warehouse platform. He had a number of experienced refrigerated warehousemen in attendance who proved to be excellent "straight men". Discussion of what to do under circumstances where a frozen product is received at 25 F and higher, 10 to 25 F, or 0 to 10 F, took place.

Following Dr. Maclinn was a discussion on the freezing of crusted turkeys by A. A. Klose. According to the Foundation Director, this discussion was requested. Although it was not directly in line with the purpose of the seminar, it did have close connection. The problem related to warehousemen receiving crusted poultry for completion of freezing, and often finding the crust had disappeared. The surface freezing had practically evaporated due to too long a time between the crusting operation and reaching the freezer establishment. Mr. Klose advised on how to judge whether to accept the birds as being crusted.

Frozen Food Code Prompts Interim Policy Suggestions

▶▶ ADOPTION of a model frozen food handling code by the Association of Food and Drug Officials of the United States, prompted declarations of policy by enterprises forming the various links in the distribution chain. Prominent among those declaring their position was Trans-American Refrigerated Services, Ltd., Colorado Springs, Colorado. Dr. H. C. "Dutch" Diehl is the Managing Director of TARS.

Until compelled to do so by law TARS' release read, TARS' members will not refuse to accept for freezer storage, frozen foods at product temperatures higher than any selected maximum temperature, unless specifically instructed to do so by the owners of the merchandise.

The release indicated a belief among the TARS membership that a tolerance of at least 10 F should now be acceptable. A gradual reduction of this tolerance, their spokesman stated, may be reviewed at intervals by the industry and enforcement representatives, as improvement of conditions proceeds.

Load at Zero Now

In the meantime, it is to be the policy of that organization to urge all shippers to load frozen food into adequately constructed and maintained refrigerated transport equipment, only at product temperature of 0 F or below.

In the suggested temporary temperature-tolerance, the declaration pointed out, there is no public health problem—only a potential quality loss. Where relatively high temperatures (well above 10 F) and time combine to cause spoilage there may be a public health problem. Recognition of a distinction between the two, TARS indicated, is important in all actions designed to advance AFDOUS plans.

More ▶

Pledge Cooperation Toward Ultimate Zero Goal

Emphasized in the TARS statement is the fact that its membership approved the cooperative program of AFDOUS and NAFPP in the preparation of a standard code for the protection of frozen foods in the public interest. Maintained constant product temperature of 0 F or lower is necessary and desirable, they believe, to protect the unique properties and quality of frozen foods. TARS, for some time, the spokesman continued, have been trying to help in a constructive spirit, customers and related industries to prepare themselves to meet the desired goal.

However, at the present it is felt that it is in mutual interest that frozen foods received at product temperatures higher than 10 F, should receive special scrutiny and handling. Prompt re-freezing under such conditions as agreed upon by the owners of the merchandise and the warehouseman, may be permissable.

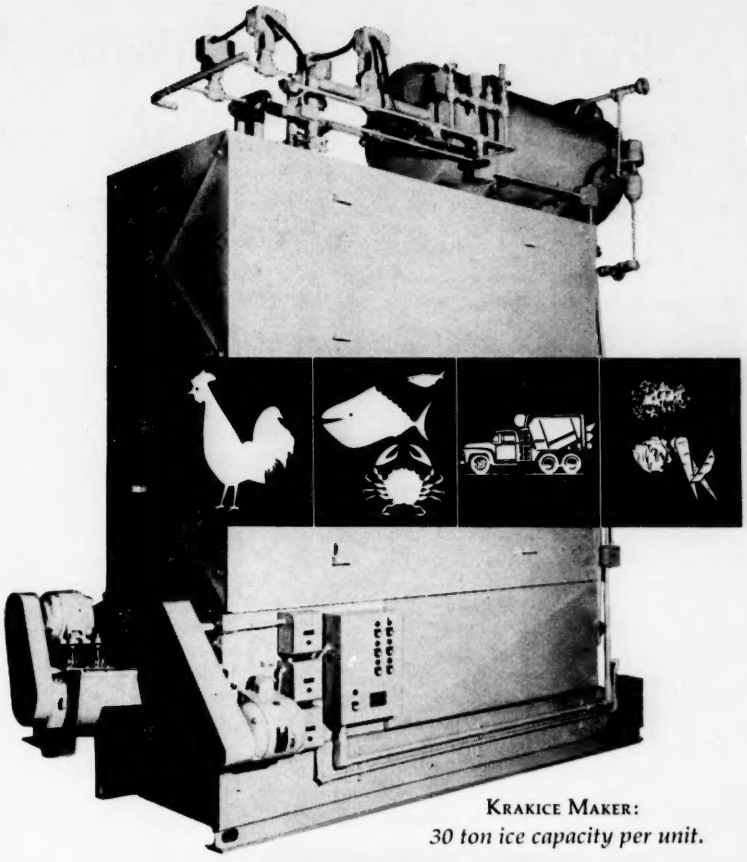
National Grocery Chains Require 0°F For Frozens

▶ SEPTEMBER COLD FACTS, a publication by the National Association of Refrigerated Warehouses, states that Safeway and First National grocery chains are requiring 0 F for their frozen foods. INDUSTRIAL REFRIGERATION had previously reported similar action by Jewel Tea Co. and the Kroger Co. In general these grocery concerns refuse to accept deliveries of frozen foods at more than 0 F, making an allowance (usually 10F) for transportation, said COLD FACTS. This announcement brings to six, the number of chains observing the 0 F policy, Delchamps and American Stores, being the other two.

Frozen Food Plant For Houston Texas

▶▶ RICH PLAN of Houston is building a new processing plant and offices in that city. A franchised operation in a $60,000 building with 5,000 sq. ft. floor area, it will consist primarily of a large process room and sharp freezing facilities, according to Richard Darling, owner.

The Rich Plan is a national organization for systematically supplying frozen foods for institutions and individuals. It is also distributor for Carrier Corp. freezers, who have recently announced a transfer of their freezer manufacturing facilities to Tyler, Texas.



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Containerized Refrigerated Meat Delivery

Packer-to- Customer Method Saves Time, Money, Handling

▶▶▶CONTAINERIZATION PROGRESS with over-the-road trucks took a significant step forward in Minnesota late in August. Over 100 local meat retailers from Minneapolis-St. Paul watched a unique new over-the-highway delivery service designed to bring the American customer the freshest meat ever delivered.

Geo. A. Hormel & Co. of Austin, a leading innovator in the meat packing industry, together with the Clark Equipment Co. and North American Car Corp., demonstrated the new development called "Thermo-Sealed" delivery service at the Southdale Shopping Center in Minneapolis.

The system brings meat directly from the packing house to the retailer in sealed, refrigerated truck body containers. It eliminates a previously necessary operation of unloading a large highway reefer at Hormel's Twin Cities Branch and reassembling and loading the meat back into a number of smaller refrigerated city delivery trucks.

And just as important, the new method is reported to keep the meat completely sealed from the outdoor air and sunshine, kept at a constant temperature and prevents shrinkage, all of which E. H. Flitton, Hormel general transportation manager says, helps the meat retain its fullest color and flavor.

Equipment Used

Three companies cooperated in developing the new system: Hormel as the user, Clark as the equipment manufacturer and North American Car Corp. which leases the equipment to Hormel.

Twenty-three pieces of Clark equipment are used for the operation: 12 aluminum reefer containers; two 40-foot aluminum flatbed trailers; two axles; one fork truck; two Diesel tractors and six delivery chassis.

The reefer containers are equipped with Clark Mobilocks, one at the center line on each side at the bottom of each reefer; and the two flatbeds and six city delivery units are equipped with a matching number of Mobilplanks used to anchor the containers to the chassis.

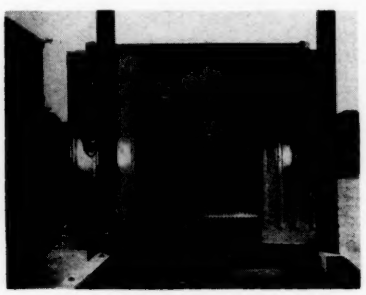
Key to the transfer operation in getting the containers off of the flatbeds and onto the city delivery trucks, centers around the latching and anchor mechanisms. The latching device in the mobile reefer unit engages the anchor mechanism on the chassis. The lock is actuated by the fork lift: when forks are inserted, it unlocks; forks withdrawn, it locks.

The Operation

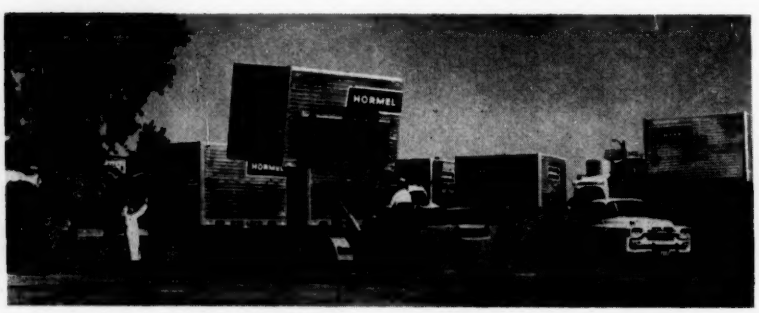
A complete unit consists of a tractor, a flatbed and three reefer containers mounted 34 inches apart on the trailer. The containers have two narrow-opening panel doors in the front and the back, except the front container, which has only back doors.

Meat is loaded according to the route and customer order on a last-in, first-out basis. Bulk of the meat is loaded by conveyor directly into the

Loaded at Hormel's Austin Packing House, the three-container unit looks like this pulling out enroute to the Twin Cities. The containers are held in place by special locking devices designed to unlock automatically when a fork truck begins the transfer operation from the flatbed.



Container Door arrangement makes it easy to load and unload. Packed on a first-in, last-out customer order schedule, each reefer is loaded up to 10,000-lbs. Rear-loading, 200-lb capacity dry ice bunker with blower fan pointed forward is located at reefer top right rear.



Rear container is transferred from flatbed to local delivery chassis by fork truck. All three reefers are switched in 20 minutes and are on their way to customers with the customary sales-driver in charge.

To the customer's door goes the container. The new system saves transit time and handling expense. This unit is the reefer from the forward position.

containers. When the forward reefer is loaded, its back panel doors are closed and the loaders go to the middle container . . . closing the front door before starting to load.

The three containers, each holding about five tons of meat, are usually loaded at Hormel Austin headquarters and are ready to go shortly after midnight. The unit pulls away from Austin for Minneapolis-St. Paul about 3:30 a.m. and arrives in Hormel's Twin Cities branch at 7 a.m.

There it is met by three of the city delivery trucks and the fork lift, which immediately takes the back container off and places it on one of the city trucks. At 7:20 the three trucks are loaded and on their way. Empty reefers which have been unloaded on the route are put on the flatbed trailer, loaded with empty lard cans, supplies and other materials and the unit is on its way back.

Containers Custom-Built

Built in Brown Trailer Division's Spokane, Washington plant, the 12 mobile reefer containers and the two flatbed trailers have several unique design characteristics which help make the loading, unloading, transport and transfer quick, easy and economical.

The containers are 11½ x 8 x 7.8 ft. overall with an inside width of 10.4 x 7.2 x 6.4 ft. Eight of the units have two narrow-opening panel doors mounted front and rear. Four of the units have no front door. The door openings are 51-in. wide and slightly over 75-in. high. Doors are mounted on stainless steel hinges and hinge pins, and recessed cam locks are used to secure the doors. The front doors open and close from the inside only, and there is no exterior hardware for the locks on the front panels.

Reefers are insulated well to help maintain a constant 35-36 F at all times when loaded. The walls and ends have four inches of *Ultralite;* ceiling has five inches. Four inches of *Styrofoam* are in the floor and four inches run up the side walls for 15 inches.

A stainless steel meat rail runs the length of each reefer on the side opposite the bunker and is used to hang carcass beef, lamb and pork. Each container has two fork lift pockets fully enclosed in a box section. Reefers weigh 4,200 lbs. empty.

An aluminum treadplate is located at the front of eight of the reefers and is used to walk on as the containers are being loaded or unloaded. It slides out and attaches to the reefer in front. A section of roof skin has been suspended from the ceiling just back of the front doors on the same eight units. These are hinged and can be slipped out and clipped to the door frame of the reefer in front. The canopy serves as protection against the elements during loading and unloading.

Refrigeration

Container refrigeration is supplied by one Foster-Built dry ice bunker mounted at the rear on the right side of each unit. Of the rear-loading type, it has a 200-pound capacity, a blower fan that points forward, and a transformer. A rubber drain tube from drip pan runs down the right rear corner, out the drain trough.

Electric System

An interesting electrical system has been designed for the containers and their chassis. Each reefer is wired for a 12-volt system and a 110-volt standby system, including I.C.C. clearance lights. Current is supplied to the containers not by wires but by a series of three steel contact pads which are touched by a matching set of three contacts mounted on the chassis.

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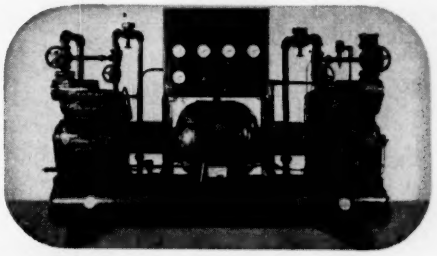
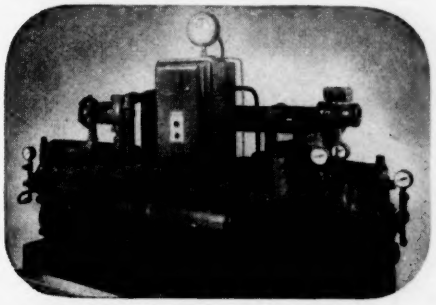


CP TYPE K AMMONIA 2-STAGE COMPACT ASSEMBLED UNIT 4 cyl. 5 x 3½ Booster with 4 cyl. 3½ x 3½ High Stage Compressor direct connected to a 1160 rpm. 60 H.P. motor. Temperature range —25° F to —55° F; 23.3 to 9.4 tons refrigeration; 54.2 to 36.3 brake H.P.; CAPACITY EQUAL TO 9 x 9, 2-CYLINDER VERTICAL COMPRESSOR @ 330 RPM OPERATING SINGLE-STAGE WITH 75 TO 100 HORSEPOWER MOTOR.



CP TYPE VS6-2 AMMONIA 2-STAGE COMPACT ASSEMBLED UNIT 6 cyl. 2¾ x 2 Booster with 2 cyl. 2¾ x 2 High Stage Compressor direct connected to a 1760 rpm. 20 H.P. motor. Temperature range —25° F to —55° F; 8.33 to 3.35 tons refrigeration; 21.5 to 14.60 brake H.P.; CAPACITY EQUAL TO 7 x 7, 2-CYLINDER VERTICAL COMPRESSOR @ 280 RPM OPERATING SINGLE-STAGE WITH 30 HORSEPOWER MOTOR.

Reefer Containers (Cont'd)

Designed by Brown, the system makes it possible to load and unload the units without fear of breaking electric wiring. The contact fingers are interchangeable. When the container drops down on the chassis, the circuit is energized. One circuit is for running lights, one circuit for the body van and one circuit for the inside loading and domelight. A pressure cut-off switch is arranged on the overlapping door at the rear of the units so the blower fan on the bunker shuts off automatically when door opens.

Five-Day Schedule

Hormel has started a five-day-a-week schedule of delivery to Minneapolis-St. Paul customers. According to Flitton, 20-25 customers can be handled by each reefer. Hormel looks at the system as one promising many advantages in the **distribution of perishable meats from the packing plants to retailers in other major cities.**

Container Trend Will Accelerate

▶▶ACCORDING TO Wilbur J. Brons, Chicago Bureau, JOURNAL OF COMMERCE, containerized refrigerator shipments are due to accelerate. This Financial Page feature writer made that observation in connection with the Hormel service described in a companion article on these pages.

Containerization, while not exactly new in the refrigeration field, has now attracted some of the larger and older refrigerated transportation operators. North American Car Co., an old line firm, is credited by many with being a pioneer in the leasing of refrigerator cars. Their larger competitor, General American Transportation Corp. has been credited with the development of the piggyback flat car. While GAT is specializing in piggyback truck semi-trailers, North American is apparently diversifying by leasing over-the-road truck equipment for short haul business.

Shorten Distribution Chain

Packers have been abandoning old distribution centers in recent years, Brons wrote, in September, because of the steady rise of fresh meat sales through chain supermarkets. These retail groups set up their own central buying and warehousing without regard to rail accessibility. Their new retail outlets are located in suburban centers away from rail facilities.

Chicago First Experiment

Hormel set about meeting that problem by using similar containers in a piggyback rail service between Austin and the Chicago market, for approximately two years. The Austin-Twin Cities service is an outgrowth of that experiment. Now the company is reported, according to Brons, as considering switching the Austin to Chicago service to highway trucks.

Brons confirmed that although the containers used by Hormel in both the Austin-Chicago and the Austin-Twin Cities services are cooled by a combination of dry ice and circulating fans, North American Car pointed out that for use over greater distances, the units can be adapted to mechanical refrigeration without difficulty.

One question arose among public and trade press correspondents covering this event: What's happened to the theory that meat had to be aged? Packer to retail delivery of fresh meats as reported in the containerized reefer and piggyback delivery services, implies less than a week between the hoof and the mouth; unless, the packers intend to expand their plant aging and storing facilities.

Scientific Bred, Fed Steers Big Factor Behind Service

The all too apparent oversight in connection with the refrigerated storage of frozen foods—the inadequate back room storages at markets—would indicate that the retailer will not be investing in any aging facilities. (Perhaps refrigerated facilities of food tenderizing plants will come in for expansion programs shortly.) INDUSTRIAL REFRIGERATION therefore inquired along these lines at the American Meat Institute.

A spokesman for the Institute pointed out that the beef consumed today is of much improved eating quality while it is still on the hoof. In days gone by grass-fed toughened animals, several years or more of age, would have required considerable aging. In those days the producer generally had what would be considered two crops. Today the market supports only one crop and much younger steers fed under scientific guidance are moved to slaughter, enabling the packer to move the product to consumer much more rapidly. The AMI spokesman "guesstimated" that ten days between hoof and mouth was more in order than the seven days related above.

PFE Places Orders

▶▶CONTRACT TO provide refrigerating systems for their recently announced 1,000 reefer car construction plan, was placed by Pacific Fruit Express Co., San Francisco, with the Trane Co. La Crosse, Wis. Trane previously furnished refrigerator plants for 300 PFE cars in 1957-58.

Witte Engine Works, Oil Well Supply Division, U. S. Steel Corp., has received an order from Southern Pacific Equipment Co. San Francisco, for 700 of its 12½ kw diesel engine generator units. These plants will power the mechanical refrigeration service in the PFE cars. The new units will bring the total of Witte-powered PFE cars to 1250.

Largest Reefer Fleet

Pacific Fruit Express, owned jointly by Union Pacific and Southern Pacific Railroads is investing an estimated $27 million in a long range program to add mechanical refrigeration equipment to its fleet of nearly 31,000 refrigerator cars. Delivery of the new equipment is scheduled to start February 1960 and be completed by September, (See announcement in INDUSTRIAL REFRIGERATION September '59, page 11).

The PFE multi-purpose cars are the 50-ft long variety with commodity capacity of 60 tons. They have been designed by PFE to maintain constant temperatures ranging from 0 F for frozen foods to 70 F for certain fresh fruits and vegetables. The refrigeration system centers around a 10-TR compressor-condenser assembly and features automatic temperature-humidity control. Electric heating is also furnished by the diesel electric Refrigerant-12 plant for winter months and mountainous regions.

Refrigerated Warehousing

▶▶REFRIGERATED WAREHOUSEMEN should be interested in the announcement in the PORTLAND, OREGON COMMERCIAL that a local new dry warehouse operation, recently completed, included temperature and humidity controlled storage. Dry warehousing is more and more requiring techniques and experience of the refrigerated warehouseman.

▶NARW COLD FACTS reported a new refrigerated cave of 10 million cu. ft. capacity at Kansas City, Mo. McMahan's Consolidated Warehouses, the operator, is a subsidiary of the Kansas City Underground Industrial Center, Inc., of which Edward L. McMahan, is president.

Industry Meetings

Dairy Conventions — **Oct. 4-10**
DAIRY INDUSTRY SUPPLY ASSN.—Oct. 4-10
Saxony Hotel, Miami Beach
MILK INDUSTRY FOUNDATIONS—Oct. 5-7
Fontainebleau Hotel, Miami Beach
NATIONAL ASSN. OF ICE CREAM MFRS.—Oct. 7-9
Eden Roc Hotel, Miami Beach

Ice Production — **Oct. 5, 6, 7**
CANADIAN ASSOCIATION OF ICE INDUSTRIES
The Chanteclear, Ste.-Adele-en-haut, Quebec

Brewing Meet — **Oct. 18-20**
BREWERS ASSOCIATION OF AMERICA
Edgewater Beach Hotel, Chicago

Ice Manufacturing — **Oct. 19-22**
NATIONAL ICE ASSOCIATION
Sheraton-Dallas Hotel

Safety Congress — **Oct. 19-23**
NATIONAL SAFETY COUNCIL
Various Chicago Hotels

Service Engineers — **Oct. 30-31, Nov. 1-2**
REFRIGERATION SERVICE ENGINEERS SOCIETY
Ambassador Hotel, Atlantic City, N. J.

Air-Cond'g & Refrig'n Exposition — **Nov. 2-5**
11TH EXPOSITION OF THE AIR-CONDITIONING AND REFRIGERATION INDUSTRY
Convention Hall, Atlantic City, N. J.

Ice Engineers — **Nov. 11-12**
SWIMA ANNUAL CONFERENCE OF ENGINEERS
Rice Hotel, Houston

Chemical Processing — **Nov. 30 - Dec. 4**
27TH EXPOSITION OF CHEMICAL INDUSTRIES
New York Coliseum

Practical Refrigerating Engineers — **Dec. 9-11**
NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
Roosevelt Hotel, New Orleans

Air Conditioning Exposition — **Feb. 1-4, 1960**
2nd SOUTHWEST MEETING & AIR CONDITIONING EXPOSITION
Memorial Auditorium, Dallas, Texas

Refrigeration & Air Conditioning Engineers — **Feb. 1-4, 1960**
AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR CONDITIONING ENGINEERS, INC.
Baker Hotel, Dallas

Practical Refrigeration — **Feb. 26, 27**
PACIFIC COAST CONFERENCE, NAPRE
CALIFORNIA CHAPTER NO. 2
Los Angeles, Calif.

Frozen Food Packing — **Mar. 6-10**
NATIONAL ASSOCIATION OF FROZEN FOOD PACKERS
Conrad Hilton Hotel, Chicago, Ill.

Air Conditioning Conference — **Apr. 27-30**
WESTERN AIR CONDITIONING INDUSTRIES ASSN.
Shrine Exposition Hall, Los Angeles

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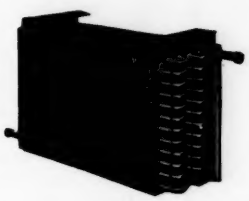
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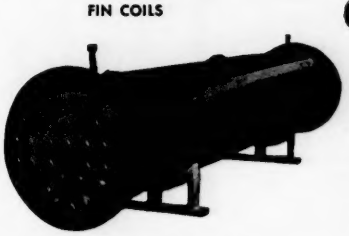
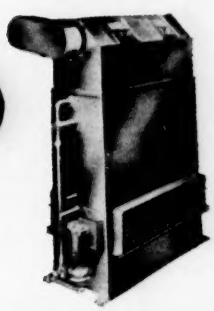
RAPID FREEZE UNIT COOLER


SHELL AND TUBE CONDENSERS AND COOLER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NIA Convention Features Industrial Icing Forums

▶▶▶MEETING IN DALLAS, Texas, October 19 to 22, members of the National Ice Association will find industrial icing phases emphasized in the practical panels which have been arranged for them on the program.

An appraisal of the ice business in four major fields of transportation is the topic of one forum. Railroad and truck icing, of course, will have a prominent place. Of ever increasing importance also is the use of ice in the fishing industry.

A fourth category added to the transportation topics is the tourist business. Added now to the customary summer cottage or camp-ground demand for ice is the desire on the part of the American tourist to do his driving in comfort. Ice activated automobile cooling systems have seen a jump in popularity in 1958 and 1959.

Touring Prospects

Because of the tourist trade, a number of associations like the New England group, are publishing a directory of cash-and-carry stations in the New England area. If all ice associates published such directories and distributed them through the automobile clubs and various service station dealers who provide tourist service, it is conceivable that a motorist on an extended vacation trip or a business man whose auto is equipped with ice cooling, could plan his ice stops in the same manner that he plans his rooming accommodations.

Hydro-cooling Growth

Possibly the second most important panel offered will be the discussion forum on ice business in the fields of processing, bulk handling and hydro-cooling. Regardless of the mode of transportation, whether it is by rail, truck, air or water, and regardless of whether salt ice or mechanical refrigeration is used in the transit facility, more meat products, fish and poultry are prepared by using various forms of processed ice. Hydro-cooling of field vegetables and fruits is equalizing the maturing variations of such products for cannery and packer use.

The third panel which will probably receive considerable attention is one on the topic of diversification. Three other panels scheduled deal with preservation and expansion of retail markets, research and marketing, merchandising and testing.

The Late R. C. Muckerman

Honor Late President

According to ICE NEWS, monthly publication of NIA, the Association will honor its late president Richard C. Muckerman on Tuesday October 20 at 8:00 a.m. A Requiem High Mass will be said for the deceased executive by Monsignor William F. O'Brien, at the Sacred Heart Cathedral in Dallas, Texas. "Much," the NIA ICE NEWS continued, "can be said about the late Dick Muckerman's civic and religious contributions to his Community, and to the Ice Industry, but he will be remembered best as a man of devotion, ideals, integrity and courage."

Ice Research News

▶FIRST in a series of informative bulletins, was ICE RESEARCH NEWS LETTER which made its appearance in mid-September. This News Letter is the communication vehicle for reports which will result from an associate arrangement between the National Ice Association and The Refrigeration Research Foundation. The News Letter contains information furnished NIA by TRRF.

The first issue was divided into three major headings which reported on research, or practical applications of research using water ice. The first heading was Fresh Fruits For Canning or Processing; second, Hydro-Cooling With Ice, and the third, Shipping With Ice.

In the first practical grouping, the ICE RESEARCH NEWS LETTER reported on studies at the University of California in which were recorded the effect of ice cooling on the uniformity of ripening of apricots, boysenberries, clingstone peaches, strawberries, tomatoes and pears. Results of studies on peaches and pears indicate that ice cooling results in tremendous improvement of ripening.

Hydro-cooling of poultry and peaches was noted in this initial News Letter. In the poultry department, a new type of continuous poultry chiller was reported.

In the shipping department, the ICE RESEARCH NEWS LETTER dealt with green onions and poultry. With both commodities, the icing was tied to development of new cartons or waterproof parchments. Costs savings in dollars and cents were reported on the top icing of onions which requires approximately 15,000 pounds per car. On poultry the report dealt with the development of a new tray pack which can be topped with three inches of crushed ice. ICE RESEARCH NEWS LETTER is distributed exclusively to NIA members.

Ice Sales Summary

▶ANOTHER bulletin published by the NIA is the annual Ice Sales Summary which made its appearance in mid-August. This annual verifies once again the tremendous effect which weather has on ice sales. According to NIA, 1958, with its cool and rainy summer weather, was a difficult year for the entire ice industry. Both dollar and tonnage sales declined. However, the Southern Division of the industry held its own and the Northwest improved its position over 1957. According to this report, the overall price per ton of ice increased, but less than 10 cents per ton. It was noted that there had been no appreciable change in the categories of ice sold, but there was continued growth in the number of automatic vending stations.

NIA Aims At Revision Of USPHS Regulations

▶REGULATIONS of the U. S. Public Health Service are presently undergoing a re-writing. Recognized as a "fountain head" of information in its field and while its jurisdiction is limited, the regulations of this agency are frequently adopted, copied or followed at local and state levels.

This agency advises against permitting conventionally manufactured ice from coming into contact with drinking water. The industry has long looked on that advice as being equivalent to labeling ice as unsanitary.

Members of the Ice Industry can assist the Ice Association, according to its officers, in prevailing upon the USPHS to modify their regulations, if they will provide the Association with (a) list of cities, municipalities or town which have regulations calling for specific inspection of ice; (b) a similar list of local jurisdiction which take periodic samples of ice for bacteriological examination.

Ice Vendor Takes On Slot Machine Tactics

▶REPORTED in the NEWARK SUNDAY NEWS, September 6, was an item that probably alerted Internal Revenue Agents to new prospects for gambling stamps. A Madison man related to reporters how he witnessed an ice unit acting like a slot machine.

This individual needed ice cubes for a party. Inserting three quarters he waited for his bag of cubes. Inside the vendor whirred and groaned to a halt. No ice.

In true customer fashion he tried pushing the button several times, then he shook the machine. Still no ice. As a parting gesture of his feelings, said the reporter, the man gave the machine a swift kick. When he turned the whirring started again.

Turning back the man witnessed the return of his three quarters, followed by a jangling which coughed up eight more quarters. Figuring this was a fine investment he scooped up his winnings, but before he could depart the door flew open and out toppled three bags of cubes. The reporter did not indicate how he knew but wrote the ice was considerably more than the man needed to keep both cocktails and guests on ice.

Florida Ice Meet

▶SELDOM is an engineering topic such as electrical insulation found on the program for executives of an ice industry group. At the Florida Ice Association meeting held September 13 to 15 at Sarasota, L. Ed Mulder, Tampa Armature Works, Inc., discussed Class Electrical Insulation and told how that material could save ice plants a lot of headaches and some money. Other speakers included M. Alley, Jr., Attorney, Tampa, who reviewed the common mistakes of management in dealing with their employees. His topic: The Failure of Management in Industrial Relations.

SWIMA Hosts NIA

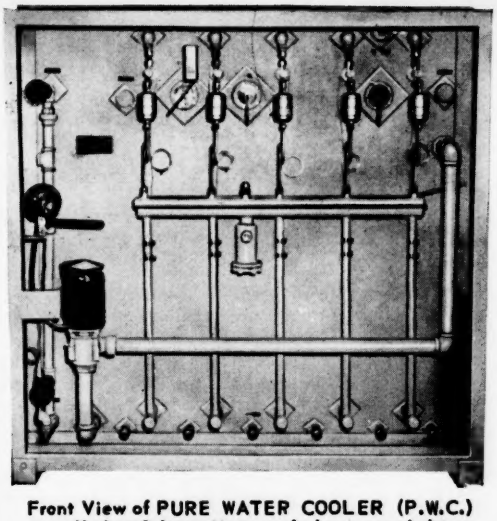
▶ATTENDANTS at the NIA Convention at the Sheraton-Dallas, October 19-22 are not only assured of the traditional Dallas hospitality on the part of the city, hotel management, etc., but the Southwestern Ice Manufacturers Association, Inc., are seeing to it that the guests are treated to typical informal Texas hospitality. On Monday, October 19, there will be a Texas Welcome and Cocktail Party followed by a Buffet to be held in none other than the Texas Suite of the hotel.

The Southwestern Association will hold its Fall meeting concurrently with the national event and has scheduled sessions on Tuesday afternoon and Wednesday morning. Tuesday evening, President Johnny Hayes and Mrs. Hayes will receive at a cocktail party to precede the National Ice Association's annual dinner dance and floor show. The following morning Mrs. Hayes will provide an eye-opener—coffee for the Texas ladies.

Canadian Ice Meet

▶ANNUAL convention of the Canadian Association of Ice Industries will be held at the Chantecler Hotel, Ste-Adele, Quebec, October 5 through 7. A director's meeting will open the affair on October 5 and the convention will officially begin with a call to order by President L. E. Heartwell, Sarnia, Ontario, Tuesday morning. A featured speaker on that date is George W. Heath of Mojonnier Associates, Franklin Park, Ill. A forum will follow the feature with Messrs. C. C. Hillmer, R. F. Pond, Allan H. Fairhead, Bernard Fortier, H. McNulty and Jean Brunelle, on the panel. Among the topics to be discussed will be How Much It Costs To Manufacture Ice, and the Cost of Quality Controlled Cubes.

STEP AHEAD with "King Zeero's" NEW Combination PURE WATER COOLER and ICE BUILDER



Front View of PURE WATER COOLER (P.W.C.) installed at Salerno-Megowen's large new baking plant at Niles, Illinois.

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The Ice Builder side of the unit may be connected to secondary equipment designed for ice water cooling such as milk coolers, tanks, dough mixers, or air conditioning equipment.

Write for Bulletin PWC 59.

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NAPRE QUESTION BOX

HAVE A QUESTION? Address it to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif. Answers appear monthly in this department on problems forwarded by NAPRE members. Comments from all readers welcomed.

H. P. Hayes

How Much Refrigeration Required In Modern Wine Storages?

QUESTION: Can you recommend the proper temperature and r.h. for a wine storage cooler? A local architect has been commissioned to design a new winery and his client indicated that he has had trouble previously with bottle caps popping in the storage cooler.—W.G.E., Detroit.

ANSWER: On page 89 of the WINE MAKERS MANUAL by Peyton Boswell, is a bibliography on Modern Methods of Wine Making. Also on page 10-06 of the ASRE DATA BOOK, REFRIGERATION APPLICATIONS, 1959, is a 17-item bibliography on refrigeration engineering for wine making. From those two publications your architect friend should be able to choose several references which would cover his problem and pinpoint a solution.

However, you may be able to obtain additional information from the technical editor of WINES AND VINES and INDUSTRIAL REFRIGERATION. Both publications have recently carried stories on wineries; for example, the story about a third winery for Mogen David which appeared in the December 1957 issue of the former and May 1958 issue of the latter.

There are several processes in wine making where refrigeration is applied, such as fermentation control, tartrate removal, must cooling, bulk holding and chill proofing. However, it is the impression here that once the product is bottled, there would no longer be need for refrigerated storage until chilling a few hours before serving. We understand that wine makers remove most solids which would continue to ferment, by refrigerated sedimentation and refrigerated filtration. With the exception of perhaps champagne and the sparkling varieties, most common wines would not require refrigerated bottled storage.

It may be that your architect's client wishes to control humidity in his storage for the purpose of preventing deterioration of his pasteboard cartons or chipboard cases. Should that be the case, it is recommended that r.h. specifications be obtained from the carton manufacturer and the system designed accordingly.—**J.M.McG and J.R.K.**

Don't Imitate Renowned Dutch Boy — Use Cereals, Not Fingers, For Leaks

QUESTION: How can a brine leak from an ice freezing tank be detected and be repaired permanently? I have a 70 TR ice plant with a brine tank 21 rows long and 20 cans wide.
—B.B., Marshfield, Wis.

ANSWER: To detect the leak and to repair a brine leak without taking your tank out of operation when at your busiest season of the year, would be a bit difficult. However, a number of plant engineers have used flax seed, linseed or bran to plug up small leaks, especially in the older style riveted tanks.

These leaks along seams will generally be plugged by the swelling of the small seeds or the bran. In many cases they effectively stop the leaks altogether until the off-season.

When the ice season has slackened off and you can drain your tank, then the location of the seed or bran along the seams will indicate the leak locations and you can plug them more permanently by caulking or welding.

Another method is to use a patented preparation called *Quick-Seal*. A number of engineers advise that they have used this material from time to time to stop small leaks. Some skating rink operators have even used it. It is marketed in Chicago.

—E.R., Chicago, Ill.

Rating Standards For Refrigerated Transport

QUESTION: INDUSTRIAL REFRIGERATION, **July 1958, page 7, announced that the Mobile Section of ARI was preparing a new standard for testing and rating trucks and special railway cars used as reefers; it was supposed that during the late Fall some news will be ready to be published.**

We are very interested in getting the present standards of reefer railway cars, and if that data has already been published, please let us know to where and to whom we must address an order to get the necessary information.

In the event that this up-to-date data on reefer railway cars is not available, we would greatly appreciate your advice as to where we can get information.

—F.G.W., Mexico, D.F.

ANSWER NO. 1: ARI has just now published their transportation unit rating method. It is reviewed under Literature Reviews, Page 33, this issue. Moreover, Mr. Fred Reed, Engineering Director of the Air Conditioning and Refrigeration Institute, can provide the latest information on two more standards now developing.
J.R.K., Chgo.

ANSWER NO. 2: Truck-Trailer Manufacturers Association, Inc., in cooperation with the U. S. Department of Agriculture and the National Bureau of Standards has developed a standard method for rating refrigerated trailers in terms of heat leakage under standard conditions.

The standard conditions selected are 100 F ambient air with 50% relative humidity, and with a 0F temperature in the trailer interior.

The method which has been developed and fully tested at the National Bureau of Standards is just now being put into operation. First commercially available testing station will be the Budd Company plant in Philadelphia, Pennsylvania. It is contemplated that further testing stations will be set up as the need develops, and it is quite possible that one or

more larger trailer manufacturing companies may wish to install testing equipment of their own to rate trailers by the standards method.

The report of the National Bureau of Standards upon which the TTMA method is based has been completed and is now undergoing editorial review and should be available for distribution in the relatively near future. **—John B. Hulse, Managing Director.**

ANSWER NO. 3: Chapter 33, Railway Refrigerator Cars, the ASRE DATA BOOK, REFRIGERATION APPLICATIONS, 1959, seems to be one of the few publications available on the topic. There are no standards for rating performance of refrigerated rail cars.

The U. S. Department of Agriculture is at present conducting a series of experiments with the cooperation of Pacific Fruit Express Co. They are attempting to establish heat leakage rates by the reverse flow method. However, their experiments have not proceeded enough for a report.

Fruit Growers Express at their Alexandria, Virginia shops have a facility for testing the performance of refrigerated railway cars. However, none of us are aware of any published results of their work.

—G.E.A., AAR, Chgo.

"Rotary" Compressors Which Employ Pistons

QUESTION: As a matter of curiosity, were the rotary compressors used at Kaiserslautern (see page 10, Industrial Refrigeration, August 1959) of American or European make? It is understood that the designation "rotary" on the Continent is not the same meaning as we know them here in the United States.

—F.L.B., St. Louis

ANSWER: The design of the machine used for refrigerant compression in the refrigerating system at the new U. S. Army Cold Storage at Kaiserslautern, Germany, has nothing to do with the well known vane type boosters as built, for instance, by Fuller in Allentown, Pennsylvania. The machines employed in the subject plant are "Rotasco" compressors and have been designed and built by Escher Wyss, Ltd. in Zurich, Switzerland for the last 20 years.

"Rotasco" is a rotary piston compressor. As provision is made for continuous injection of chilled oil into the cylinder, the machine can be run with a high pressure ratio without danger inadmissibily high temperatures on the delivery-side and may therefore do the job in one compression stage where other companies need a booster for the first, and reciprocating compressors for the second or even third stage of compression.

Obviously the overall efficiency (TR/kwh) is considerably better using a two-stage compression but many customers are nevertheless willing to give the preference to a simple plant easy to operate even if the efficiency should not be so high. "Rotasco" compressors are built in six sizes. A more detailed catalog will be issued in English within a few months if your readers would care to have them.

—Escher Wyss Ltd. Zurich

Editorial Note: Your question is well put. The managing editor at press time questioned the original text which indicated that rotary compressors were used exclusively. Since the author was on vacation on the West Coast and unavailable, the editorial department leaped to the most usual, but in this case the wrong, conclusion that a conventional 2-stage mechanical refrigeration system was employed, using rotary compressors for boosters. On his return the author called the office to correct that portion of his paper and suggested that the compressor manufacturer be invited to comment on their machine.

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IN ADDITION — Phillips pilot operated valves are available for all common refrigerants, down to —50° F. Operates with as low as 2 PSI pressure drop and up to 250 PSI with selected springs. Line sizes ½ inch to 4 inches with steel or copper connections.

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LITERATURE REVIEWS:

New Cooling Tower Standard Aimed At Fire Prevention

▶▶ STANDARDS, CATALOGS and BULLETINS while not in the same form or extensive coverage of a text book, consistently contain information of importance to the owner of a refrigerating or industrial air conditioning plant, to the designers and contractors of such installations, and to the operating personnel and maintenance men responsible for their successful use. October being National Fire Prevention month, INDUSTRIAL REFRIGERATION therefore reviews a new standard brought about by the many fires that have occurred in this particular type of equipment—cooling towers. Another Standard on transport refrigeration units, Engineering Data Book on pipe and fin coils, and a bulletin on refrigerated purging shall also be noted.

STANDARD ON WATER COOLING TOWERS 40 CENTS

National Fire Protection Association

▶ CONTRARY to popular opinion, many water cooling towers do burn. While many owners and engineers recognize the fire hazard when towers of wood construction or wood-filled are out of service, many of those same operations would be surprised to learn that an unusually high number of fires have occurred when towers are in use.

As a result, the National Fire Protection Association at its 1959 annual meeting adopted NFPA 214-*Standard On Water Cooling Towers*. This 16-page Standard is available from NFPA at 60 Batterymarch St. Boston 10, it was announced by Robert S. Moulton, Technical Secretary.

While location and construction of towers is included, the Standard also includes installation of electrical equipment and methods of protecting the towers. Exempted from requirements of the Standard are relatively small factory built units of entirely non-combustible materials. The Standard is expected to be widely used as a guide by building inspectors and plant protection people.

Development of the Standard was by the NAFPA Committee on Water Cooling Towers, headed by Leslie A. Dutton, Los Angeles County Fire Department. The committee included representation from among public officials, insurance firms, and delegates from the Cooling Tower Institute.

ENGINEERING DATA BOOK $1.50

Rempe Co., Chicago

▶ ORIGINALLY published in 1947, scope and popularity of the *Engineering Data Book* published by the Rempe Co. has grown to where the 1959 issue consists of 48 pages of convenient references for the designer, draftsman, contractor and supervising engineer. Authored by Arthur J. Vogel, General Manager of the Company, the latest edition features two additional pages of data which includes depressant factors for pipe and fin coils when operating at high altitude conditions, such as encountered in altitude chambers and environmental simulation enclosures.

Basically the booklet contains specific data on dimensional limitations, coil development formulae and heat transfer factors. Cost of the publication is waived when a request is submitted on a bonafide business letterhead.

TRUCK-TRAILER REFRIGERATION EQUIPMENT 75 CENTS

Air Conditioning And Refrigeration Institute

▶FIRST ARI Standard for refrigeration units designed for use in refrigerated trucks and trailers, was released September 2. Title of the Standard under preparation for two years is *ARI Standard for Speed-Governed Transport Refrigeration Units Employing Forced-Circulation Air-Coolers*. The description "speed governed" unit is defined in this Standard by the Air Conditioning and Refrigeration Institute, as a unit whose drive is designed to operate at a governed (constant) speed. The new publication is designated ARI Standard 1110-59.

Purpose of the Standard is to provide a specification of what constitutes minimum standard equipment; rating requirements; methods of testing; and proper marking of this type for transport refrigeration units employing forced circulation air coolers. Both high temperature cooling units and low temperature units are covered in the publication. **Therefore a Standard on truck-trailer refrigerating units for the frozen food industry is now available.**

Two More Standards Planned, Then A Certification Program

While conformance with the Standard is completely voluntary, equipment represented as being in accordance with the Standard shall conform to all the provisions thereof. Work on a second equipment standard covering hydraulic drives and other types of available speed units will be undertaken immediately by the Technical Committee of the Mobile Section, ARI. An application standard to relate the design and other performance characteristics of both types of units to a certification program will also be undertaken.

Upon completion of the latter two standards, it is hoped that a certification program may be initiated by ARI Mobilization and Air Conditioning Section. Announcement of the current work came from ARI Chief Engineer Frederick J. Reed. Henry O. Kirkpatrick, American Manufacturing Co., is chairman of the Mobile Section Technical Committee.

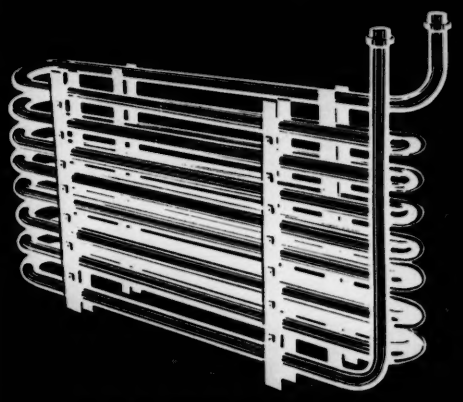
GUIDE TO REFRIGERATED PURGING

Armstrong Machine Works

▶ISSUED late in August is a 12-page bulletin entitled *Armstrong Guide To Refrigerated Purging*. This publication goes beyond the average manufacturer's product bulletin in that it explains in practical language why purging is necessary, how non-condensibles affect efficiency and how to tell when purging is necessary.

Owners of refrigerating equipment and their engineers will find the booklet a very useful addition to their reference files. Unique to this bulletin is a detail of problems involved by purging manually. Refrigerated purging principles are explained and two tables are included to show the amount of refrigerant lost at various temperatures with ammonia or Refrigerant-12, when purging manually as compared to refrigerated purging. The tables were prepared at the suggestion of INDUSTRIAL REFRIGERATION magazine and reviewed by professional engineers in the industry.

Practical instructions are contained in the bulletin, such as how to use the refrigerated purger, where to make the purge connections and selection of a refrigerated purger for specific plants. The data includes purgers for propane, ethylene, carbon dioxide and Refrigerant-11, in addition to conventional models for Ammonia and Refrigerant-12.



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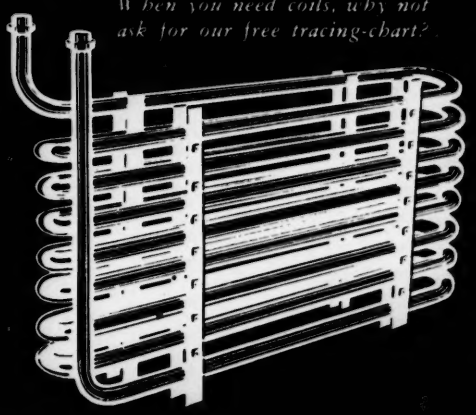

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NAPRE Meeting Program Announced

New Orleans Civic Center Plants To Be Inspected

▶▶ EDUCATIONAL FEATURES of the annual meeting of the National Association of Practical Refrigerating Engineers to be held December 9, 10 and 11 at the Roosevelt Hotel in New Orleans, La., were announced on September 1 by Richard E. Zach, educational program chairman. Topics range from Jacketed Freezer Rooms to Central Station Air Conditioning, from Oil Analysis and Control in Refrigerating Systems, through Safety for the Refrigeration Plant, and from Compressor Valve Discussions to Shrimp Processing. There will even be a paper on New Brewery Refrigeration Construction and An Analysis of the Lithium Bromide Absorption Systems available.

Wednesday Program

Kick-off educational feature following the opening business meeting on Wednesday, December 9, will be a compressor valve panel discussion. Accepting an invitation to discuss the valve gear in their new reciprocating compressors, is Joseph Raufeisen, chief refrigeration engineer, Bell & Gossett Company. Mr. Raufeisen, is, according to the July issue of INDUSTRIAL REFRIGERATION, page 28, the party responsible for the industrial air conditioning application employed in the compressor assembly plant at B & G, and the engineer who is principally responsible for their compressor design.

On the panel also will be Van J. Sparks of Ball Valve Company which employs a ball-check principle in the compressor valves they market. Still another type of valve gear employed in reciprocating compressors of another large Eastern manufacturer will be described by E. D. Lindsley of that firm. He is Manager, Techn. Serv. Sect., Worthington Corp.

Jacketed Freezer Rooms

The Wednesday afternoon educational billing features Joseph W. Slavin on the topic of Jacketed Freezer Room Construction. As mechanical engineer for Fisheries Technological Laboratory, Slavin is the author, or co-author, of a number of papers on this topic. (He authored the article in the September issue, IR, page 18.)

Control of oil in the refrigeration system will be presented by the Manager, Product and Application Engineering, York Div., Borg-Warner Corp. The discussion will cover attempts to stop oil from leaving high speed refrigerant compressors, and the methods of returning the oil to the compressor from evaporators in industrial refrigerating applications.

Announced as speaker on oil analysis is Wallace M. Smith, Technical Service Department, General Chemical Division, Allied Chemical Corp. Smith will present a paper on Sludge Analysis in a Refrigeration System, to be followed by practical demonstrations on analysis procedures which can be made by the refrigerating engineer in his own plant.

Thursday Program

Leading off the Thursday morning educational sessions will be the construction presentation on refrigerating plants for breweries. Following that paper, Zach will present a paper abstracted from a more formal presentation he prepared for advance refrigeration work at the University of Wisconsin. The paper will deal with lithium bromide—water vapor absorption systems. He will highlight those design considerations which the practical engineer should understand, and compare briefly the economy of these systems with the more conventional compression refrigeration systems.

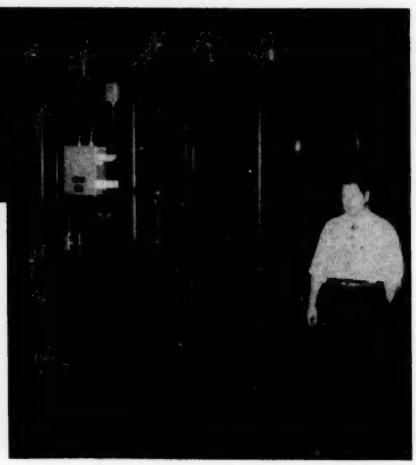
Thursday afternoon will be given over to the traditional mid-meeting "Postman's Holiday". Annually, engineers and attendants at the NAPRE meeting adjourn in the middle of their convention to have a look at some of the more outstanding refrigerating applications in the locality. This year they plan trips to the American Cyanamid plant at Avondale, Louisiana, the New Orleans Cold Storage Company new warehouse on Airline Highway, and the central station air conditioning plant at Tulane University. Also available for shorter lunch-hour plant visitations are the new central station air conditioning plants in the New Orleans Civic Center. The City Hall, State Building, and Public Library will be open to the engineers for their inspection.

The Delgado Trade School at New Orleans will also be open daily to the NAPRE members. This school features apprenticeship training programs for building, operating and various other trades. Louisiana Chapter No. 2, NAPRE, cooperates in the instruction course at Delgado.

Fish Day Program

Appropriately for New Orleans a shrimp processing discussion will open the Friday morning educational program. Featured will be Dr. E. A. Feiger, Chairman, Department of Biochemistry, Louisiana State University, Baton Rouge. His topic will be Handling and Freezing of Shrimp for Cold Storage.

THE ULTIMATE IN THE COMPRESSION REFRIGERATION CYCLE*



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By LEO J. VIVIEN

William H. Russell of L. S. Weil & Walter B. Moses, consulting engineers, will follow Dr. Fieger on the program. Russell is the consultant responsible for the Tulane University power plant and water chilling system recently installed (See INDUSTRIAL REFRIGERATION, September 1959, page 34). Expected is the discussion of the extent to which automation may be economic in systems of this kind.

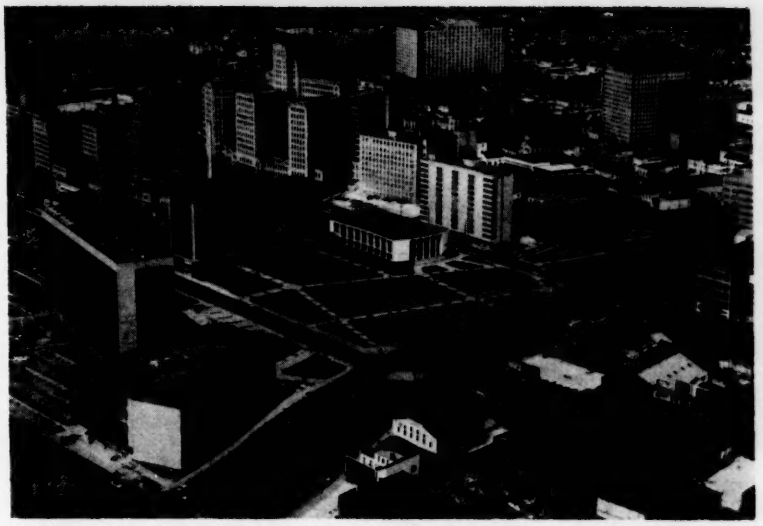
Safety And Training

Raymond C. Ellis, Jr., Senior Safety Engineer, Food Process Industries Division, National Safety Council, will address the engineers on their safety record in the industry. Last year John H. Herzog, Buergermeister Brewery, San Francisco, told the refrigerating engineers that their frequency rate as a group is very low in comparison with other industries, but the severity and lost time rate for their few accidents, was extremely high. Ellis is expected to expand on that topic and develop a few case histories into some preventive programs. He has previously been a featured speaker before some of the NAPRE Chapters, being reported in this publication in January, 1959.

Anchor man for the educational program will be the assistant educational chairman of NAPRE, Guy R. King. Prof. King has chosen the title "The Modern Operating Engineer; A Technician". His theme will probably expand the thought introduced by previous speaker Russell. Automation, while saving some on manpower will not eliminate the practical engineer. Instead it requires a more highly skilled, higher salaried technician to service and maintain the automated system.

New Orleans Civic Center

Key project in the revitalization of New Orleans' central business district is now complete. That project is the New Orleans Civic Center—five modern new public buildings fronting on a new landscaped park immediately adjacent to the downtown business district. The five structures, a Civic Courts Building, City Hall, State Office Building, Supreme Court Building, and a new main Library have replaced a former rock-bottom slum—the worst in the city.



New Orleans' Civic Center, a complex of five public buildings, has provided a new center of government activity for efficient operation and public convenience. Buildings of the $25 million dollar development: l. to r., Civic Courts Building, City Hall, State Office Building, State Supreme Court, and Main Public Library.

Occupying the commanding position in the Civic Center is the glistening new $8 million dollar City Hall, dedicated in May 1957. In this 11-story air conditioned structure are consolidated municipal offices formerly scattered in ten different buildings. The historic transfer of the seat of municipal government from the former 108-year old City Hall on Lafayette Square is a symbol of the dynamic growth of New Orleans during post-war years.

Spearheaded by Mayor deLesseps S. "Chep" Morrison, the city's Chief Executive since 1946, New Orleans has been dramatically transformed into a national showcase of what an ambitious and progressive people can do. The new central railroad terminal, new overpasses and underpasses, new expressways and boulevards, a giant new bridge over the Mississippi River, and a new terminal building at Moisant International Airport are perhaps the most spectacular recent and current projects.

Tenth Floor Engine Room

Like many modern buildings, the New Orleans' City Hall features a top floor engine room. The plant engineer relates that many visitors ask why the engine room is located on the 10th floor rather than in the basement. The building designers, architects and engineers give a number of excellent reasons.

Construction costs seem to top the list. Today's modern equipment is primarily packaged and are of superior light weight material by comparison with mechanical and electrical equipment of a fortnight ago. Their compactness and balance all but eliminates vibration also.

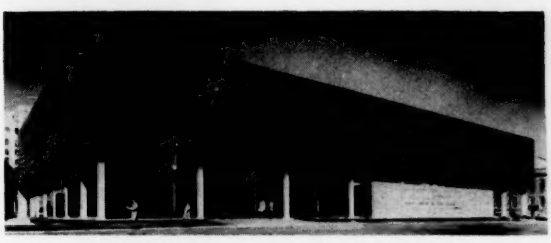
Improves Operating

With smaller, vibrationless, and stronger equipment the machinery is easily located on a top floor where it contributes to the scheme of keeping operating costs down, as well as original structure expense. For example, steam is used as a prime mover in the New Orleans City Hall. It is far less expensive to run a boiler stack from the 10th floor to a safe level above the roof than to run it from the basement. Ten floors of flue-work were eliminated.

Another feature is that the cooling tower and air conditioning equipment are located on the same floor but the main steam condensers, and air conditioning condensers are actually higher than the highest level of water in the cooling tower sump. Piping runs from the tower to condensing equipment for the steam and air conditioning plant that would formerly be located in the basement, have been eliminated.

(Continued on Page 38)

The new City Hall, City of New Orleans, La.

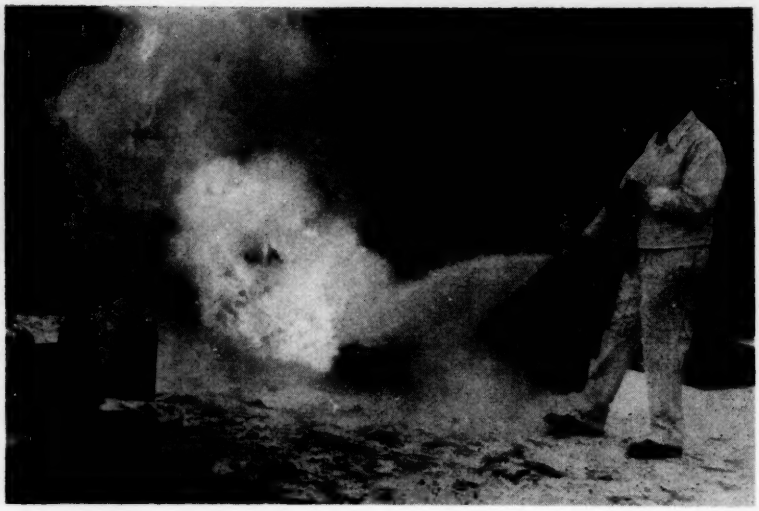


Main Public Library, New Orleans Civic Center

Program News Among The NAPRE Chapters

Roy T. Burns

▸▸TWO MOST IMPORTANT PHASES of practical training for refrigeration engineers do not deal directly with refrigeration; nor do they deal with air conditioning principles or the very important utility of electricity. Emphasized by the Association's educational committee as rating two separate programs annually, are safety and fire prevention. NAPRE President Roy T. Burns in his message of January 1959 in INDUSTRIAL REFRIGERATION, emphasized the importance of safety programs. His remarks must have carried considerable impact to the industries employing refrigeration as a utility, for his message found its way into the National Safety Council's ASS'N NEWS LETTER.



Fire control demonstration given by J. M. Clark of Ansul Chemical Corp., for the Los Angeles Chapter, NAPRE Safety Program. The national educational committee of the Association urges all chapters to schedule a Fire Prevention meeting in October, and a Safety Program in 1960.

Safety Inspectors

Burns comes by this safety-fire prevention sensitivity naturally, as he was for many years the refrigeration inspector for the city of Detroit. Two other presidents of the association have paralleled Burns in their emphasis of these two features, namely, Alvis J. Clay of Memphis, Tenn., and Leo J. Vivien of New Orleans. Both held similar inspection positions in their cities. Vivien today is the chief mechanical inspector and will be one of the hosts to the NAPRE convention in December where the National Safety Council Senior Safety Engineer, Raymond C. Ellis, is a speaker.

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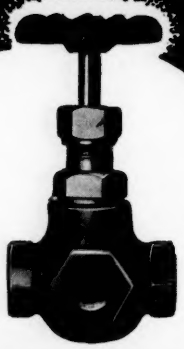

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SAFETY—FIRE PREVENTION

Dominate NAPRE October Programs

Typical of NAPRE's Safety and Fire Prevention Programs are those reported this month by Fred Herr of Los Angeles and Charles A. Conley of Memphis. A previous paper of Conley's brought him an invitation to address the Industrial Fire Prevention Association of Memphis, Tenn. That paper was condensed and published in the August issue of INDUSTRIAL REFRIGERATION. Other associations have recently requested permission to reprint Conley's paper.

Two-Part, Two-Scene Show For L.A. Safety Program

▶ PRESENTED in two sections and in two different locations on the same night, was a program devoted to safety in refrigeration plants, offered by Los Angeles Chapter, NAPRE, last Spring. First part was in the form of a talk illustrated with slides, during which George Roewe, technical engineer, "Freon" Products Div. DuPont Co., discussed proper handling presented in the chapter's regular meeting place, the Los Angeles Terminal Club following a half hour business session and a one hour class.

Second section of the program was presented in the Fourth Street, Central Avenue plant, California Consumers Corp. It consisted of a fire fighting demonstration by J. M. Clark of Ansul Chemical Corp., during which he demonstrated, with actual fires built in metal pans and carboys, what types of fire extinguisher are most effective against which types of blaze.

Fire Fighting Demonstration

J. M. Clark, Ansul Chemical Corp., manufacturers of fire extinguishing equipment, directed this phase of the program. Basically, the demonstration consisted of building fires in metal pans and large metal cans—fires of wood, gasoline, oil, waste material and a butane gas pressure fire. Clark then demonstrated how control of a specific type of fire should be brought about, and then explained which type of fire extinguishing material was most effective for different types of blaze—dry chemicals, foam or water types, etc.

Clark explained his procedures as he went about the job of putting out various types of blazes. He explained the principles of fire prevention and fire control. He outlined the accepted techniques for controlling and eventually extinguishing various types of fires which may develop inside or outside a plant.

He also explained the technique for extinguishing fires with extinguishers charged with dry chemicals. A stream of dry chemical driven by pressure from gas cartridges, he explained, releases carbon dioxide and water vapor upon entering the flame within the fire to a point that will no longer support combustion.

He pointed out as an example, that if a plant employee is faced with a sudden fire from broken piping, he should concentrate on putting out the fire at the breaking point first. Then he should extinguish the burning oil, or whatever other material it is, which has spread to the floor. In pressure jet fires he should direct the chemical through to the point of combustion and into the fire itself. Thus, in a burning horizontal jet, he should station himself directly behind the jet if possible, and mingle the dry chemical stream with the stream of the fuel. In cases of multi-level fires, Clark advised, the flames should be put out at the farthest point first, and then the fire fighters should work back to the source.

Tenn. Chapter Witnesses Memphis Fire Training

▶ PRACTICAL refrigerating engineers at Memphis made a plant tour of the Claude Armour-Flicker Street Fire and Police Station Training Center in July. This station, named after the fire and police commissioner, was considered the most up to date training and control center in the United States. Fire Departments from all over the North American Continent hold their annual meetings in Tennessee, NAPRE members learned.

Firemen for the City of Memphis, which is rated as having the best fire department and the lowest fire insurance rate, begin their practical training at this station. In addition to learning how to operate all the equipment from various types and sizes of hoses and nozzles, to handle ladders and nets, these firemen also learn how to jump into nets, apply artificial respiration and mechanically actuate inhalation equipment. They are additionally taught the elements of first aid and how to remove disabled persons in the best practical manner without contributing to their injuries. All this was demonstrated for the NAPRE engineers.

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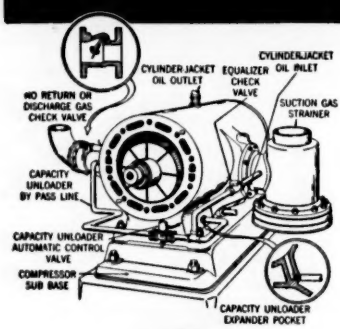
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NAPRE Convention (Cont'd)

The location of the air conditioning condenser higher than the cooling tower sump prevents carryover of sediment or mud from the tower to the condenser as would occur if the condensers were located in the basement. These contaminants are more easily removed from the base of the tower than the time and effort involved in taking down condensers for periodic cleaning.

Some savings is made in the kilowatt hours by the elimination of the problem of pumping cooling water from the basement to a tower. However, a certain amount of this savings is put back into the circulation of the chilled water and air. Nevertheless the savings is considerable when it is understood that the larger portion of tower water would be used for steam condensers rather than air conditioning. Also, the lower pumping heads on the condenser pumps save considerable maintenance.

Refrigerating Machinery

Two centrifugal condensing - chiller machines totalling 1500-TR are employed for the City Hall air conditioning. The larger machine is rated at 900 TR, chilling 2300-gpm from 53 to 43 F when supplied with 3200-gpm condensing water entering at 87 and leaving at 95 F. Total air conditioning condenser requirement is 5250-gpm when the chilled water circulated is 3250 gpm.

A battery of chilled water pumps circulate the coolant to three interior zones, while another battery of three pumps can be alternated or combined to provide hot or chilled water to an exterior zone. The exterior air conditioning zone consists of the offices and areas adjacent to the skin of the building.

Chilled water is supplied to both interior and exterior zones from the main engine room. The three interior zones employ factory assembled units housing chilled water, preheat and reheat steam coils and electrostatic filters. The air is 100 percent fresh moved through the system by turbine driven fans. Two units supply 27,000 cfm at approximately 500 rpm and 45-bhp. A third unit supplies 10,000 cfm at approximately 1130 rpm and 20 bhp. Approximately 450 thermostats control over 1100 room or exterior zone area induction units.

Control Showpiece

Control center operating engineers in the City Hall can tell at a glance the amount of chilled water being supplied to the major zones. Flow-meters show in gpm the water being handled by the pumps in operation. Continuous recording and indicating instruments show the temperature of the water at important points in all zones. Pumps, fans and coils in operation are indicated on a control board where they may be clearly seen, as are the major valves. Telltale lights indicate to the engineer when any pump or fan is inoperative.

NAPRE Coast Chapters Plan Spring Conference

▶▶ FOLLOWING closely on the publicity heels of the 1960 plans by the Pacific Northwest Conference of NAPRE chapters, came an announcement from the California groups that there would be a Southwest Pacific Conference February 26 and 27, 1960. The Californians with other NAPRE's at-large in Nevada and Arizona are determined not to let the Northwest get ahead of them.

Larry H. Benedict, 1st Vice-President of California Chapter No. 2, Los Angeles, conference chairman protem, announced late in August the theme and proposed subjects for the February meeting which is expected to attract delegates from eight chapters and approximately seven states. NAPRE has a motto: Morality, Economy, Competency. Benedict contends that newcomers, and the public alike, are little aware of these higher ideals of the Association. The theme announced therefore reads: Morality, Economy, Competency, in operation and maintenance of air conditioning and refrigeration plants.

Subjects announced for the 2-day meeting including the Rebuilding of Compressors Using Metal Spray, and the Repair and Rebuilding of Larger Horsepower Freon Compressors. Prominent in speaker requests from the membership are such subjects as the Service and Repair of Liquid Control Valves and Gas Flow Regulators.

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More "Icing Up"

ride and other forms of plastic pipe are being used for the refrigerant circuit beneath or through the ice sheet. Although this material has some disadvantages (which probably equalizes its advantages over steel, wrought iron and other forms of pipe used) it has nevertheless found considerable favor. However, it is strange to note that some of the designers and contractors who use these new materials, also rely on the more conventional materials in a large portion of their work. There seems to be a tendency to use the plastics for portable installations and steel products for the more permanent facility.

Application Innovations

Construction techniques with both plastic and steel, with polyethylene film and concrete, seem to vary as much as the designs. Some contractors when installing a permanent rink operate for at least one year with a water flooded, sand-filled floor in which the piping is imbedded, before pouring a monolithic floor. Others show preference in header connections, return bends and the methods for anchoring the refrigerant coils in the floor or in the ice sheet.

Operating Practices

It has also been observed that operation practices, floor preparation procedures and resurfacing techniques vary as widely as the geographical locations and the theory or experiences of the operators. One famous permanent installation employs a patented resurfacing machine. This operator finds many followers over the country. On the other hand, an apparently equal number of operators prefer preparing and resurfacing their sheets by hand, with their own experienced help.

Skaters All

It has been observed also that those responsible for the ice sheets generally have a good engineering background, but more important to the enterprise (and surprising perhaps, too, to our readers), these engineers and operators are generally excellent skaters. (As for your reporter, he borrowed the mailman's ice grippers to follow these engineers and operators around, which also meant cornering these guys against the side-boards in order to get an interview.)

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CONSULTING ENGINEERS

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FOR SALE — 3 Frick 2 cyl. compressors 11½x12 with 3 Ideal synchron. motors 175 h.p. controls, pipes, etc. Sacrifice. The Gloen Co. Box 2513, New Orleans, La.

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Use CLERTEMPICE—clears and tempers ice.
Born Company 80 East Jackson Boulevard.
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FOR SALE
9x9 York duplex, 200 h.p., 360 r.p.m.
2—Carrier floor mounted cold air diffusers
10 & 25 h.p. air compressors.
JOHN F. CARSON
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Philadelphia 34, Pa.
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WANTED — 1 York Model #IDV-10A industrial dry coil air conditioner. Please furnish full description, specifications, best price, where located, age, etc., to Hollywood Brands, Inc., Hollywood Candy Division, Centralia, Ill.

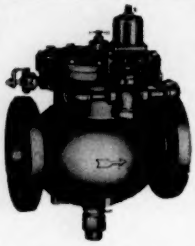
Refrigeration Equipment For Sale

GOEBEL BREWERY — MUSKEGON PLANT
All equipment still erected as last used, including York 7½x7½ with Westinghouse 40 h.p. 60/440/3, York 8x8 Model D-6, G.E. 60 h.p. 220/440/60/3, completely overhauled 1956; York 9x9 Model D-6 with G.E. 70 h.p. 60/440/3 completely overhauled 1956; 24" x 12" ammonia receiver; 10" x 52" oil trap; 2—24" x 16" shell and tube ammonia condensers, retubed 1956; deep well pump, capacity 90 g.p.m. against 75' head; thousands of feet of galvanized ammonia pipe, individual room coolers or diffusers, pumps, etc. Write for free listing; Maurice Osterman, Vice President, % Chas. S. Jacobowitz Corp., 3080 Main St., Buffalo 14, N.Y. Phone AMherst 2100.

WANTED TO BUY — 20 to 30 ton booster compressor. Also ammonia compressor 6x6 or 7x7. Also "Freon" compressor with or without water cooling; blower units and other miscellaneous refrigeration equipment. B. Hill, Hill Packing Company, 323 W. 5th St., Topeka, Kansas.

FOR SALE — AMMONIA EQUIPMENT
3—15 ton complete Frick ice making plants, new, in crates, no air system, sold as used.
2—10"x10" 4 cyl. Carbondale duplex DC to 225 h.p. 300 r.p.m.
1—9"x9" 4 cyl. York duplex DC to 150 h.p. motor, 300 r.p.m.
2—9"x9" 2 cyl. York DC to 75 h.p. motor.
1—10"x10" 2 cyl. York DC to 125 h.p. motor.
1—9"x9" 2 cyl. Frick compressor.
1—6½"x6½" 2 cyl. York compressor.
1—3"x3", 1—4"x4", 2—5"x5" condensing units. 3x3", 4x4", 5x5", 6x6" compressors.
11x22x51" 300 lb. ice cans, also 11x22x47" ice plants, 25 to 100 ton capacity, complete. 10 shell & tube condensers, 25 ton capacity.
1—300# Gifford Wood cubing machine.
ENTERPRISE EQUIPMENT CORPORATION
328 Bryant Ave. Bronx 59, N.Y.
Cable ENTREMA Phone DA 8-2121

INDUSTRIAL REFRIGERATION APPLICATIONS DEMAND HEAVY DUTY CONTROL VALVES

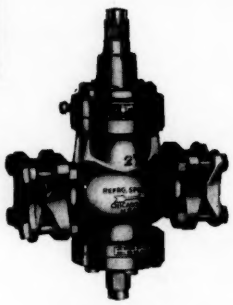


Large 1½" to 4" Water Regulators 2-Way and 3-Way

Combination Water Regulators for R-12, R-22 2-Way and 3-Way

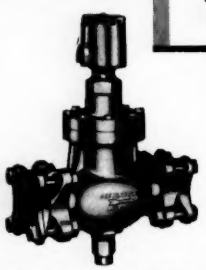
FOR REFRIGERANTS **R-12** **R-22** AND **AMMONIA**

For those large or important jobs where reliability and serviceability are essential, engineers specify R/S Solenoid Valves, Evaporator Regulators and Water Regulators.



V-Ported Back Pressure Regulator For Evaporator Control

Threaded Welding or Sweat Flanges



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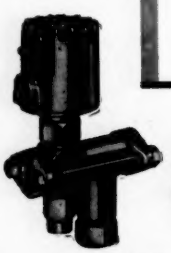

Liquid Suction Hot Gas Water Solenoid Valves

R S CONTROLS

REFRIGERATING SPECIALTIES COMPANY

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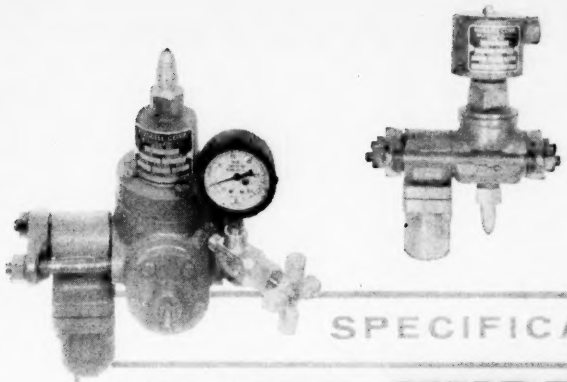

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VALVES: HUBBELL or equal

PIPING:

ELECTRICAL:

WIRING:

LIGHTING:

actually HUBBELL has no equal

because:

***equal* would mean**—the valve you install has been manufactured under Hubbell's quality control standards to provide service-free operation throughout its life.

***equal* would mean**—only a product that incorporates all of the care and effort Hubbell takes to manufacture valves and controls that reflect honest value and quality.

***equal* would mean**—controls that eliminate costly maintenance.

***equal* would mean**—quality metals, moulded and machined to Hubbell's craftsman standards, sold and serviced by reputable sales representatives.

***for Quality Controls specify* HUBBELL**

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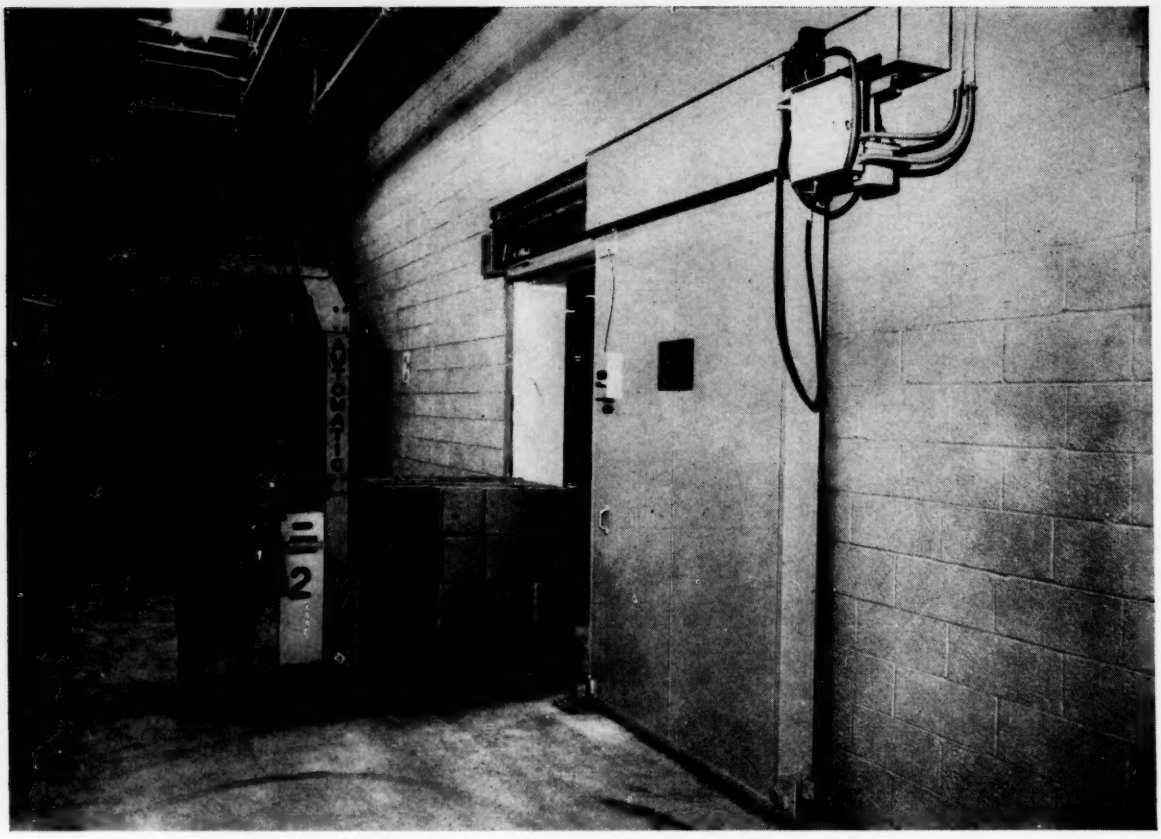
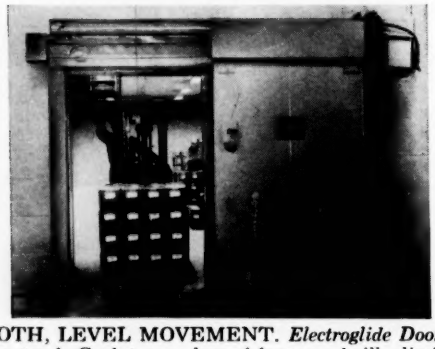
CONSTANT LIQUID PRESSURE SYSTEMS • WINTER CONTROL VALVES

Visit Hubble Booth #414, ARI Show, Atlantic City, Nov. 2-5.

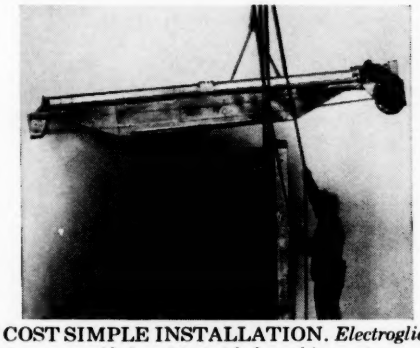


PULL SWITCH *operation of door from truck adds convenience, saves time.*

Automatic Jamison **Electroglide**® Door speeds handling in sensitive drug and chemical storage



SMOOTH, LEVEL MOVEMENT. *Electroglide Doors ride level on track. Gaskets are clear of frame and sill, eliminating drag and premature wear.*



LOW COST SIMPLE INSTALLATION. *Electroglide Doors are factory assembled and tested before shipment.*

Jamison Electroglide Cold Storage Doors are designed for *modern* storage and warehousing. Special Jamison features—available in no other door—assure rapid easy opening and low maintenance . . . cam lock compression seal with door weight counterbalanced, shock absorbing chain link for smooth operation.

In important storage areas like the new Eastern Distribution Center of Chas. Pfizer & Co., Inc., Clifton, New Jersey, Jamison Electroglide is being specified to help maintain critical temperatures and speed truck traffic.

Get the full story on Electroglide by writing for new product bulletin to Jamison Cold Storage Door Co., Hagerstown, Md., U.S.A.

JAMISON

COLD STORAGE DOORS